A STUDY ON PROSODIC ASPECTS OF KANNADA LANGUAGE*

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For the comprehension of speech, not only discrimination of consonants but also cues like stress, inflectional patterns, the melody of the language are necessary.

' The weight given to various perceptual factors in intonation will vary from language to language. For example, users of a tone language attach greater relative weight to pitch variations than users of non-tone languages. When we come to rhythm and stress it is clear from observation that languages do differ considerably in the weight given to various factors. It is widely believed that the over-riding factor in stress judgements is the relative loudness of successive syllables but there is little support to this (Fry, 1966).'

It has also been reported that loudness, length, pitch and quality all play a part in the perception of stress and hence to determine their relative weight in any given condition, intensity, duration, fundamental frequency and spectrum have to be studied. In a language like English, length has been found to play a major role, and loudness a subsidiary part; in German, loudness seems to carry more weight than the length. It seems in French, loudness is more important.

While summarizing the results of the experiments conducted to study the influence of duration, intensity, fundamental frequency and spectrum variations upon stress judgements in English, Fry (1955, 1958, 1965) says that when duration was directly compared with intensity, it was found to have much greater weight in determining stress judgements.. .Fundamental frequency variation was shown to have a complex effect.. .changes in vowel spectrum, equivalent phonetically to vowel reduction, were compared directly with duration changes and found to be less effective than the latter; a relatively small change in duration produced a swing in stress judgements equal to that effected by a change from the unreduced to the neutral vowel.

Languages in which both length and stress appear as mutually independent distinctive features are quite exceptional and if the stress is distinctive, it is frequently supplemented by a redundant length.

' There are in addition some languages in which stress differences appear to have no linguistic function. Jones (1962) mentions as being in this class, Japa-

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these, Hindustani and Marathi' (Fry, 1966) ' Most observers agree that there are at least 3 levels of stress in the native speakers pronounciation of Kannada sentences. These may be described as emphatic (extra loud) normal (loud) and reduced (soft). Emphatic stress most often used in commands.. .Normal stress may have more than are peak in any sentence or word (McCormack, 1966).

Fairbanks defines rhythm in speech as a pattern of vocal change, which is inherent in speech or draws attention to the need for tegular ventilation or breathing pattern which underlies pause, stress, rate, pitch, and intensity. Accent refers to the relative stress on a syllable in a word which plays an important role in speech.

The present study is an attempt to know the prosodic aspects of Kannada language which by review of literature is found to be scanty.

Methodology

Five sentences, which could also be used as part sentences were arbitrarily chosen. An attempt was however made to include ' part sentences,' which could be used as: (1) statement or question, (2) which had minimal inflection, only on the verb.

The sentences were:

1. ನಾನು ಅವರ ಮನೆಗೆ ಊಟಕ್ಕೆ ಹೋಗಿದ್ದೆ.
2. ಅವನು ಮರದ ಮೇಲಿಂದ ಬಿದ್ದು ಸತ್ತನಂತೆ
3. ನೆನ್ನೆ ಎಷ್ಟು ಮಳೆ ಬಂತು.
4. ಅವರು ಬಂದಿರೋದು ನನಗೆ ಗೊತ್ತು.
5. ಕಪ್ಪೆ ಮೀನು ತಿಂತು.

Translation of the sentences:

1. I had been to his house for dinner.
2. It seems he fell from the tree and died.
3. How much it rained yesterday,
4. Their having come to me is known (I know they have arrived)
5. Frog ate fish.

(These sentences were broken into words and each word was written on a card)

Ten sentence contexts were chosen so that the same set of words and all the words making up that sentence could be used in all the contexts, for each of these five sentences.

Experiment —1

7 Males and 3 Females, out of which 7 had Kannada as mother tongue and 3 Kannada Iyengars who used Kannada predominantly, were given ten sentence

contexts with the set of words that were to be filled. They were asked to complete these ten sentence contexts using all the words. They were also told that they could use the words in any order they liked. After the subjects had completed the 10 sentence contexts, the subjects were asked to rehearse and to ' speak' the sentences. These spoken sentences were recorded using a (Telefunken, Cassette) Tape Recorder.

Experiment—2

Two Kannada speaking judges who had studied linguistics and phonetics were requested to identify the stressed word in the recorded sentences. They were plainly requested to listen to the tapes and mark the stressed words. No additional definitions were given.

The sentences spoken for the second time by the subject under the experiment 2 were analysed with the help of an A.F. Analyzer and a level recorder (Bruel and Kjaer) for information regarding intensity variations and the pauses in the sentences. Word order used in various sentences was charted to see whether the word order was a factor in stress.

Results and Discussions

A comparison of the stressed words as identified by the two judges was made. The two judges had independently identified stresses in separate situations. They did not discuss the data among themselves.

It was found that the judges agreed on stresses in 244 sentences. Out of 500 sentences in the general data (Experiment No. 1 and 2) of ten speakers, speaking five different sentences each in ten different context.

The consistency check made on the ten sentences in experiment No. 2 showed that one of the judges was consistent. One judge showed more than 80 per cent agreement with the judgements made on the same sentences spoken by the same speaker earlier. There were secondary stresses which had been marked on some sentences which were not marked in the earlier session. However, this has not been considered a variation because more time was available to the judge in the analysis of the sentences in experiment No. *2.* The second judge was not consistent in the judgements on the same sentences that were recorded in experiment No. 2. He showed an agreement of 56 per cent only. This inconsistency indicates the probable complexity and the difficulty in identifying stress given in small context. The judge is well trained in linguistics and therefore it is assumed that this lack of agreement between two judgements is more a factor of complexity of the task. When a further comparison was made across the judge it was seen that judge-1, identified more stressed words than judge-2. Judge-1, had perhaps marked both primary and secondary stressed words where as judge-2, had generally marked only one or two stressed words perhaps primarily stressed words. It was noticed that judge-2, had generally

marked as stressed words by judge-1. The fact that he marked different words in the two sessions seems to indicate that his difficulty was more in deciding whether the stress was 'primary' or secondary. This difficulty might be one of the important factors contributing to the discrepancy between the judges. The difficulty in differentiating between primary and secondary stress emphasizes complexity of this factor.

The word order used by the different speakers in the sentences in the different contexts was analysed. Table-1 shows the word orders chosen for the different sentences. It can be seen that in each of the sentences there is one or some times two preferred or generally used word orders. When the word order is changed it is noticed that often the most frequently stressed word is brought to the initial position. This is noticed mostly in sentence one, four and five. This needs to be studied further with sentences given in contexts such that there is forced shifting of stress. Therefore word order seems to have an additional function of emphasis.

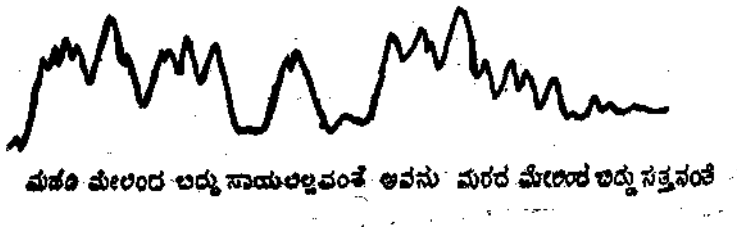
TABLE 1

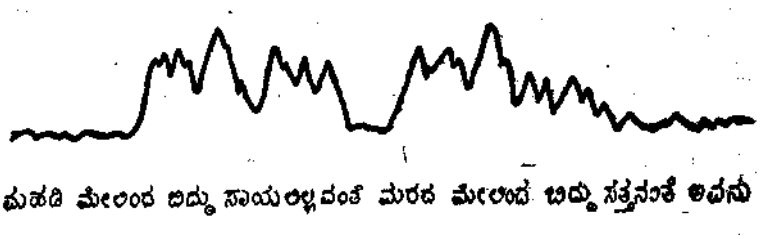
Frequency distribution of word order and stress on each word

Freq. distribution of word order	Stress on each word	Freq. distribution of word order	Stress on each word
Sentence-1	-	*Sentence-3*	
1234-52	1-24	1243-63	1-28
2341-26	2-89	2134-15	2-S3
1324-12	3-39	2341-12	3-78
3241-8	4-27	234-2	4-25
2431-1		3241-2	
3124-1		1324-2	
		3412-1	
		3421-1	
		2413-1	
		2314-1	
Sentence-2		*Sentcnce-4*	
1234-61	1-7	1324-68	1-26
3412-18	2-59	2341-21	2-72
2312-7	3-59	2134-2	3-39
3124-5	4.-70	3124-2	4-54
1243-2		3412-2	
1342-1		1243-2	
1432-1		2314-1	
4123-1		4123-1	
2314-1		4312-1	
		Sentence-5	
		213-56	1-74
		123-41	2-67
		231-1	3-17
		121-1	
		132-1	

However, one word order was forced and a comparison was made on the stress word it was seen that the stress was retained with a word indicating that word order is not essential as a stress maker.

Graph below shows two graphs as recorded by level recorder marking average intensity versus time of two sentences chosen from experiment-2.





In one of the sentences the subject had a choice of word order and in the other order was forced. These sentences were chosen because they exemplify some of the points that we observe in the analysis of the intensity variations and pauses with reference to stress. In the ten sentences that were chosen for analysis it was found that there was agreement between the judges in all sentences, both the times. The two judges agreed at least on one stressed word in every sentence. However, there were a number of additional stresses marked by judge-1, perhaps secondary on which judge-2 had no marks.

There were four words on which judge-2 had marked same stress but on which judge-1 had no marks.

An analysis was made of the features related to:

1. agreed stress (2) stress marked by judge-1 only and
2. stress marked by judge-2 only.

It was found that when the two judges agreed, the graph indicated a combination of a relative intensity increase and a pause preceding the word vide

graph above. There were a number of words which had greater intensity than the words marked as stress. Therefore it is not absolute intensity but the relative intensity that seems to make for stress. The stressed words showed greater in intensity levels than the words around them, apparently adjustments are made for normal intensity increases at the beginning of the sentences and those that are intrinsic to some sounds like 'ba'. Similarly there were words preceded by pause which were not identified as stressed. This indicates that the pauses alone does not seem to make for stress.

When judge-1 only identified stress, the most prominent feature observed were the preceding pauses and sharp rise in intensity. The slope of the intensity increase was greater.

When judge-2 only identified stress he seemed to have relied upon an increase in intensity and the greater duration of the word.

In summary with a relative increase in intensity, steepness of the intensity rise. A pause before the word and a larger duration of the word are the features observed in this study as contributing to stress in Kannada. Therefore, it is clear that stress in Kannada is not dependent on mere levels of loudness as McCormack (1966) implies.

Loudness seems to be more important than length, as in German. However, more study is needed to recognise the relative weightage of the different factors involved. Frequency spectrum analysis has not yet been done in Kannada, The present study seems to be the first controlled attempt at an analysis of the factors related to stress in Kannada.

The importance of such a study for a better understanding of our languages' in general, and in particular for providing the guidelines for speech and language therapy need to be recognised.

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