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SPEECH RHYTHMIC DIFFERENCES IN KANNADA-ENGLISH BILINGUALS

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INTRODUCTION:

Rhythm is defined as a systematic pattern of sounds in terms of prominence, timing and grouping (Patel, 2008). Maintaining a rhythm in a speech makes the speech sound natural and fluent. Rhythm is produced by stressed and unstressed words in a sentence. Using only the stressed words in a sentence may make a speech sound dull and artificial. The listener may also not understand the intended emphasis or meaning in the speech.

The importance of speech rhythm is however not restricted to word segmentation and recognition only but beyond the word level it is together with intonation the rhythm organizes speech interacting with different linguistic domains such as morphology, syntax and semantics creating prosodic constituents (Selkirk, 1978; Nespor & Vogel, 1986; Hayes, 1989; Inkelas, 1990).

The rhythms of different languages around the world differ. Language, like music, has a hierarchical structure to it. All spoken languages include isochronous speech units, and all languages can be classed according to their rhythm. Kuriakose, Dhupkar, and Bharath (2019) looked into the rhythm of Goan Konkani speakers and found that the trend of a low normalised Pairwise Variability Index (nPVI) value and a high raw Pairwise Variability Index (rPVI) value is a fundamental feature of syllable-timed

language. In their current analysis, they discovered a similar pattern, indicating that Konkani is a syllable-timed language.

The rhythm of several Indian languages has been discovered by many scholars. English is a phonemic language acquired by 70% of bilinguals in India. However, limited researches on speech rhythm in Kannada as a first language and English as a second language have been conducted. Grasping the rhythm of each language specific to gender differences offers therapeutic benefits, in that rhythm may be used to treat a variety of ailments.

Need of the study:

Languages with distinct rhythms have long provided as a source of inspiration in phonetic study. The rhythm of several Indian languages has been discovered by many scholars. English is a phonemic language acquired by 70% of bilinguals in India. However limited cross linguistic researches on speech rhythm in Kannada as a first language and English as a second language have been conducted. Grasping the rhythm of each language specific to gender differences offers therapeutic benefits in that rhythm may be used to treat a variety of ailments. Individuals with language prosody impairments can be taught rhythm. Understanding the gender specific rhythms of each language has therapeutic benefits since the rhythms may be utilized to cure a number of illnesses. It is possible to teach rhythm to those who have difficulty with linguistic prosody.

Aim of the Study:

1. To compare Rhythmic difference between the languages Kannada (L1) and English (L2) in bilinguals.
2. To find the influence of first language on the rhythm of second Language.
3. To analyze if there is a substantial variation in rhythm between female and male.

METHODOLOGY:

A group of 30 typical adults in the age range of 18-30 years (with mean age of 24 years) who were further divided into two groups i.e., 15 females (group 1) and 15 males (group 2) took part in the present study. The participants were native (L1) Kannada speakers and (L2) English speakers respectively with normal IQ, vision and voice quality. Individuals who had any history of neurological or cognitive impairment, hearing impairment and/or visual impairment were excluded from the study.

The study was carried out in two phases:

Phase I: Recording of data through a speech material (picture/passage)

Phase II: Analysis of the recorded data through a speech analysis software.

Procedure:

Speech samples were collected from one person at a time. Instruction was given to see the picture provided and carefully describe it. A one minute speech sample in both English and their native language was elicited from both the groups. Speech samples were audio recorded using a digital voice recorder (Olympus-WS-100) at a sampling frequency of 16 kHz. The vocalic measure refers to the duration of vowel which was measured as the time duration from the onset of voicing to the offset of voicing of the vowels. Intervocalic measures refer to the duration between two vocalic segments. It was measured as the duration between the offset of the first vocalic segments and onset of the second vocalic segments. It was measured as the time duration between the offset of the first vocalic segment to the onset of the second vocalic segment.

Analysis:

The speech samples were analyzed using PRAAT 5.1.14 software (Boersma & Weenik, 2009) by eliminating the pauses. This was done in order to get an appropriate measure of the vocalic and intervocalic segments. The Vocalic (V) and Intervocalic (IV) segments were highlighted using a cursor and durations were measured. Vocalic measure refers to the duration of a vowel/semivowel/diphthong which was measured as the time difference between the onsets of voicing to the offset of voicing for that vowel/semivowel/diphthong. Intervocalic measure refers to the time difference between two vocalic segments. It was measured as the time difference between the offset of the first vocalic segment to the onset of the second vocalic segment. Pairwise Variability Index (PVI) was developed for rhythmic analysis. It is a quantitative measure of acoustic correlates of speech rhythm, and it calculates the patterning of successive vocalic and intervocalic (IV) intervals.

The PVIs were calculated using the following formulae:

Formula 1: nPVI (Normalized Pairwise Variability Index)

$$n\,PVI = 100 \times \left[\sum_{k=1}^{m-1} \left| \frac{d_k - d_{k+1}}{(d_k + d_{k+1})/2} \right| / (m-1) \right],$$

Where "m" is number of intervals, Vocalic or Intervocalic, in the text and "d" is the duration of the Kth interval. Low used a normalized version of the PVI in their measurements on vowel durations. Normalization involves expressing each difference as a proportion of the average of the two units involved (e.g., their average duration).

Formula 2: rPVI(Raw Pairwise Variability Index)

$$rPVI = \frac{100}{m-1} \times \left[\sum_{k=1}^{m-1} \left| \frac{d_k - d_{k+1}}{(d_k + d_{k+1})/2} \right| / (m-1) \right]$$

Where "m" is number of items in an utterance and "d" is the duration of the kth item. rPVI equation shows that the nPVI is compiled by calculating the difference in duration between each pair of successive measurements, taking the absolute value of the difference and dividing it by the mean duration of the pair. nPVI and rPVI differs only in omitting the third step. The differences are then summed and divided by the number of differences. The output is multiplied by 100 because the normalization produces fractional values.

PVIs were calculated using the above formulae in the Microsoft office excel program. Languages are classified as stress timed, syllable timed, mora timed or unclassified based on vocalic and intervocalic PVI values.

The durational difference between successive vocalic and intervocalic segments were calculated and averaged to get Pair wise Variability Index (Low, Grabe and Nolan 2002). Comparison of PVIs of the above groups to find out the influence of native language rhythm type on second language was done.

RESULTS AND DISCUSSION

The current study aimed to compare Rhythmic difference between the languages Kannada (L1) and English (L2) in bilinguals, the influence of first language Kannada (L1) on the rhythm of second Language (L2) and to uncover if there is a substantial variation in rhythm between females and males.

The normalized Pairwise Variability Index (nPVI) and raw Pairwise Variability Index (rPVI) values were obtained using appropriate statistical methods. The results of the present study indicate that rPVI values of English show closer approximation to Kannada in both the genders. Result also shows that rhythm type of Kannada is closer to English as a second language which suggest a close proximity between both the languages as in a continuum in accordance with the findings. It shows that there is no significance in results with respect to gender differences.

To conclude, we have seen that there has been no impact of first language (Kannada) over second language (English) and there was no significant difference observed between both the genders with respect to impact of first language over second language.

LIMITATIONS

- Limited sample size

- Age range below 18 years and above 34 years is not focused in the present study.

FUTURE DIRECTIONS

- This study can be conducted across different languages of India and different ages using conversational and other narration tasks.

- Most of the Indian population deals with more than two languages in the present scenario. The researchers in Indian context has not put light on Rhythmic influence on multi lingual individuals so this study can provide a baseline for the cross linguistic differences in multilingual and disordered population.