

# Acoustic Parameters of Voice in Singing \*

RAGINI, M.

The present study was undertaken to investigate the acoustic parameters of voice in singing.

This was done by measuring and comparing the following voice parameters in reading, reciting and singing conditions ;

1. Fundamental Frequency.
2. Range of Fundamental Frequency.
3. Vowel Duration.
4. Word Duration.

Ten trained singers in classical music, 5 females and 5 males, with minimum training of 5 years were taken as subjects. The recording material was one of the popular Kannada poems which could be easily used for singing. The first stanza of this poem was selected for the acoustic analysis.

The subjects were instructed to read the poem first, then to recite and later to sing in a particular tune, after practising it. The model was provided to the subjects earlier.

The above three performances were recorded using a high speed spool tape recorder, in a sound treated room.

The sample was fed to PM-100 and the mean fundamental frequency, range of

fundamental frequency and the mean word duration were measured.

The duration of the vowels [ a ], [ i ], [ u ] were obtained using the High Resolution Signal Analyzer (B & K).

The collected data was analysed statistically. The 't' test and Mann-Whitney U test were used to know the significance of mean difference of the above mentioned voice parameters in reading, reciting and singing conditions.

## Conclusions

The following conclusions were drawn from the present study :

- (1) In female group, when the mean, fundamental frequency was compared, there was no difference between :
  - (i) Reading and reciting conditions
  - (ii) Reciting and singing conditions,
  - (iii) Singing and reading conditions.
- (2) In male group, when the mean fundamental frequency was compared, there was no difference between :
  - (i) Reading and reciting conditions,
  - (ii) Reciting and singing conditions,
  - (iii) Singing and reading conditions.

---

\* Master's Dissertation. University of Mysore, 1986.

- (3) There was difference between male and female subjects in reading condition when fundamental frequency was compared.
- (4) There was difference between male and female group in reciting condition when fundamental frequency was compared.
- (5) There was no difference between male and female subjects in singing condition, when fundamental frequency was compared.
- (6) There was no difference, in female group, when the range of fundamental frequency was compared between :
- (i) Reading and reciting conditions,
  - (ii) Reciting and singing conditions
  - (iii) Singing and reading,
- (7) In male group, when the range of fundamental frequency was compared, there was no difference between :
- (i) Reading and reciting conditions,
  - (ii) Reciting and singing conditions,
  - (iii) Singing and reading conditions.
- (8) There was no difference between male and female group in reading condition, in reciting condition and in singing condition, when the range of fundamental frequency was compared.
- (9) There was no difference between reading and reciting conditions, in female group when the duration of vowels [ a ], [ i ], [ u ] was compared.
- (10) In female group, when the duration of vowels [ a ], [ i ], [ u ] was compared between reciting and singing conditions, significant difference was observed.
- (11) There was difference between singing and reading conditions, in female group, in terms of duration of vowels [ a ], [ i ], [ u ].
- (12) There was no difference between male and female groups in reading condition, in reciting condition and in singing condition when the vowel durations of [ a ], [ i ], [ u ] was compared.
- (13) There was no difference between reading and reciting conditions in female group, when the mean word duration was compared.
- (14) In female group, when the mean word duration was compared, there was difference between :
- (i) Reciting and singing Conditions,
  - (ii) Singing and reading conditions.
- (15) In male group, there was no difference between reading and reciting conditions when the mean word duration was compared.
- (16) When the mean word duration was compared in male group, there was difference between :
- (i) Reciting and singing conditions,
  - (ii) Singing and reading conditions.
- (17) There was no difference between male and female group in reading and in reciting conditions when the mean word duration was compared.

- (18) There is difference between male and female group in singing condition when the mean word duration was compared.

Thus, this study shows the trend in changes in the acousticaj .parameters in singing.

### **Implication**

This study provides information regarding :

- (a) The changes in fundamental frequency, range of fundamental frequency, vowel duration and word duration with respect to reading, reciting and singing conditions in both males and females respectively.
- (b) The differences in the above parameters between males and females in all the three conditions.

### **Limitations**

- (1) Sample was small.
- (2) The acoustic parameters considered in this study were :
  - Fundamental Frequency.
  - Range of fundamental frequency.
  - Vowel duration.
  - Word duration.

### **Recommendations**

- (1) The study should be carried out on a large scale.
- (2) Further investigations of acoustical parameters like vowel spectra, the rhythm pattern and other factors in singing should be carried out.