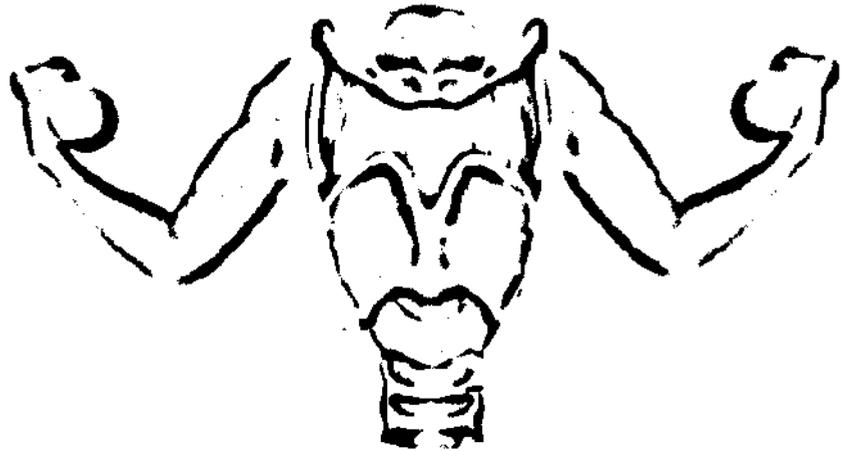


Effect of training on voice projection



AIISH Research Fund Project

No. SH/Coordination/ARF/3.23/2006-07 dated 20.06.2006

30.6.2006 to 29.6.2007

Principal Investigator

Dr. S. R. Savithri

Professor and Head

Department of Speech-Language Sciences

All India Institute of Speech & Hearing

Manasagangothri, Mysore 570 006

AIISH Research Fund Project

Sanction No. No. SH/Coordination/ARF/3.23/2006-07 dated 20.06.2006

Personnel: **Mr. G Ram Mohan, Research Officer**

Total Fund: **1,47,145/-**

Project duration: **12.months (3f>12006 to@.6.2007)**

Principal Investigator: **Dr. S. R. Savithri**

Professor & Head

Department of Speech-Language Sciences

All India Institute of Speech and Hearing

Manasagagothri, Mysore - 570 006

INDIA.

Acknowledgements

The investigator acknowledges the Director, All India Institute of Speech and Hearing, Mysore for the financial support.

Thanks are due to all subjects who participated in this project. A special thanks to Mr. G. Ram Mohan who tirelessly trained the participants on various aspects of voice.


Dr. S. R. Savithri
Professor & Head
Department of Speech-Language Sciences
&
Principal Investigator

List of contents

SI. No..	Title	Page No.
1.	List of contents	3
2.	List of tables	4
3.	List of figures	5
4.	Introduction	6-8
5.	Method	9-13
6.	Results	14-41
7.	Discussion	42-44
8.	Conclusions	45
9.	References	46
	Appendix I - Booklet on vocal exercises	i- lxxxiv
	Appendix II - Reading passages	

List of tables

Si. No.	Title	Page No_
1	• Mean and standard deviation of in phonation of vowel /a/.	14
2.	Mean and standard deviation of Fo range in phonation for vowel /a/across recordings.	16
3.	Mean and standard deviation of FO in speech across recordings.	17
4.	Mean and SD in FO range in speech across recordings.	18
5.	Mean and SD of FO in reading for all recordings.	20
6.	Mean and SD of FO range in reading for all recordings.	21
7.	Mean and SD of intensity for phonation for all recordings.	22
8.	Mean and SD of intensity Mean and SD of intensity range in phonation across recordings.	23
9-	Mean and SD of intensity in speech (in dB) across recordings.	24
10-	Mean and SD of intensity range in speech (in dB) across recordings.	25
U-	Mean and SD of intensity in reading (in dB) across recordings.	26
12.	Mean and SD of intensity range in reading (in dB) across recordings.	28
13.	Mean and SD of alpha ratio.	29
14.	Mean and SD of beta ratio across recordings.	30
15.	Mean and SD of gamma ratio across recordings	31
16.	Mean and SD of vital capacity (in liters) across recordings.	32
17.	Mean and SD of mean airflow rate (in ml/sec) across recordings.	33
18-	Mean and SD of MPD of vowel /a/ (in seconds) across recordings.	34
19.	Mean and SD of MPD of vowel <i>HI</i> (in seconds) across recordings.	35
20.	Mean and SD of MPD of vowel/u/(in seconds) across recordings.	36
21-	Mean and SD of rate of speech (WPM) across recordings.	37

List of figures

Sl. No.	Title	Page No.
1	LTAS of a speech signal.	12
2	Error bar for fO in phonation.	15
3	Error bar for FO range in phonation.	16
4	Error bar for FO in speech.	17
5	Error bar for FO range in speech.	19
6	Error bar for FO in reading.	20
7	Error bar for FO range in reading.	21
8	Error bar for Intensity in phonation.	22
9	Error bar for intensity range in phonation.	23
10	Error bar for Intensity in speech.	24
11	Error bar for Intensity range in speech.	25
12	Error bar for intensity in reading.	27
13	Error bar for Intensity range in reading.	28
14	Error bar for alpha ratio.	29
	Error bar for beta ratio.	30
16	Error bar for gamma ratio.	31
17	Error bar for vital capacity.	32
18	Error bar for mean airflow rate.	33
19	Error bar for MPD of vowel /a/.	34
20.	Error bar of MPD of vowel /l/.	35
21.	Error bar of MPD of vowel /u/.	36
22.	Error bar for rate of speech (WPM).	37
24.	Rate of speech for participant 1.	38
25.	Rate of speech for participant 2	39
26.	Rate of speech for participant 3.	39
27.	Rate of speech for participant 4.	39
28.	Rate of speech for participant 5.	39
29.	Rate of speech for participant 6.	39
30.	Rate of speech for participant 7.	39
31.	Rate of speech for participant 8.	39
32.	Effect size.	41

Introduction

"Listen carefully. Words can lie, but the voice never does.... "

Voice is the modified air through vibration of vocal folds. The human voice is a powerful tool for communicating emotions, manipulating messages, and entertaining others. Command of voice begins in infancy. There are a number of professionals who use their voice to earn their livelihood and they are termed professional voice users. Professional voice users include teachers, singers, artists, clergy, politician, newsreaders, radio-Jackie, and corporate to some extent. All of them need a good voice to survive and to compete with others.

There are no clear definitions as to what a good voice is. But, in general it is agreed that a good voice is clear, resonant, stable, well supported by adequate breath control. It is a pitch level that is appropriate to the speaker and the message. Rate of speech is such that messages are clearly understood. A good voice has variety.

Projected voice is viewed in the literature as one that has reinforced high overtones and good breath control. "When a voice contains greatly reinforced series of high pitched overtones, it is said to be brilliant or projected and is analogous to a bright light. In a bright voice the high pitched frequencies are paramount. Because high frequencies have more impact on our ears than low, they excite our emotions. Low frequencies in the voice lull us unless they are quite intense. Both the pharynx and oral cavity lend support to the weak high overtones of the fundamental pitch. Second, the frontal vowels resonate at very high frequencies, and the clearer or purer the vowel, the sharper the impact of these high formants. When a trained singer tunes the high frequencies of the

vowel to those of the musical pitch, the sound projects extremely well. There is a third high frequency in every good voice. The resonance occurs between 2800 and 3200 Hz, regardless of the sung pitch or vowel. The source of this ring is debatable, but it seems to occur most in persons who sing with a lowered larynx, a high velum, and a great deal of power". *"Breath, phonation, and resonance* may be seen as members of a 3-way partnership. Each is responsible for sound production and each is dependent on the others for a good sound production. High breath pressure accompanied with great breath flow, flexible vocal bands, large pharynx produce mellow sound, low intensity, and reinforced low frequencies. High breath pressure accompanied by less breath flow, stiff vocal bands, and small pharynx produces harsh sound, high intensity, and reinforced high frequencies. High breath pressure accompanied by great antagonistic support, less breath flow, stiff vocal bands, large pharynx produces fully resonant, ringing sound, high intensity, and reinforced frequencies at both ends of the aural spectrum (Alderson, 1979).

Projection is a characteristic of both career voice and the singing voice. At the foundations of projection is *the proper use of breath*. It is very important to learn control of exhalation. In addition to very definite difference in volume, controlled exhalation frequently changes the quality of the voice. A steadiness of tone results from supporting the breath. The voice without diaphragmatic control often wavers and sometimes cracks. Breath control determines projection" (Cranell, 2000)

Therefore, projection, in this study will be defined as a quality of speech/reading. A good projected voice will be considered as that which has energy spread at high frequencies.

Professional voice users are at risk in the development of laryngeal disorders. Therefore, they need to care and use voice properly. Till date there is no suitable methods evolved to teach and to maintain good voice at least in the Indian context. In this context, the present project aimed at (a) developing training material for professional voice users, and (b) evaluating the efficacy of such training material.

Method

The project was carried out in 2 phases, Material was developed in phase I and efficacy of material on voice training was evaluate in phase **II**.

Phase I: Development of material

Material: Training material in English was developed. The material included notes and exercises on the following:

Speech production

Mechanisms for speech - Breathing, phonation, resonance, articulation

Pitch - Definition and exercises

Loudness - Definition and exercises

Voice quality - Definition and exercises

Projection - Definition and exercises

Rate of speech - Definition and exercises

Articulation - Definition and exercises (English articulated by Kannada speakers will be considered)

A booklet developed in the project provides instructions and exercises for specific aspects of voice. The exercises described in the project present as much information as possible in order to assist the reader in creating his or her best possible voice. Individual chapters discuss anatomy and physiology of speech production mechanism, respiration and breathing exercises, pitch and its exercises, resonance and its exercises, voice quality and its exercises, projection and its exercises, rate of speech and its exercises and articulation and its exercises.

This manual assists the participant in discussing what to do to become a good speaker. Appendix I gives the material developed.

Phase II: Evaluation of efficacy of training material

Subjects: Local newspaper advertisement was given to invite the interested participants. Although there were 23 enrollments, only 4 participants completed five months training and 4 completed six months training program. Participants consisted of 4 females who ranged in age from 20 to 25 years and 4 males who ranged in age from 21 to 28 years. All the participants reported that they were in good health and had no evidence of hearing or voice disorders. Voice quality was tested at the outset using Dr.Speech (Tiger DRS, Version 3.20) and participants with normal voice quality were considered for training.

Procedure: All the participants were educated on anatomy and physiology of speech production mechanism using Body Works software (Classic edition, CompuServe Inc, USA). Once the participants were familiar with speech production mechanism other chapters were taken up for training. The experimenter trained participants on various aspects such as (a) respiration and breathing exercises, (b) pitch and its exercises, (c) resonance and its exercises, (d) voice quality and its exercises, (e) voice projection and its exercises, (f) rate of speech and its exercises, and (g) articulation and its exercises. The experimenter demonstrated the exercises and the clients had to practice in the same manner. Training sessions were conducted in two groups. Three participants (1 female and 2 male) attended morning session and 5 participants attended evening session (3 female and 2 males). Training sessions were conducted for one-hour daily for 5 days in a week for 5 months in the department of Speech-Language Sciences. Of the eight participants only four (3 female and 1 male) could attend training classes

on the fifth month rest four terminated training after fourth month owing to personal reasons.

Data collection: Initial baseline measurement was taken at the outset of the training program. Thereafter, data was collected after every month of training. Thus, in total five recordings (1 baseline and 4 recordings) from four.. participants who underwent four month of training and six recordings from four participants were obtained. Subject's reading of a 300-word story in their mother-tongue, phonation of vowel /a/, /i/, and /u/, and speaking on a free topic for 5 seconds at comfortable pitch and loudness waere audio-recorded. Samples were analyzed to extract habitual frequency (phonation), frequency range (phonation) amplitude (phonation), amplitude range, rate of reading (words per minute), articulation (reading) and projection (voice quality - a,the, ratio)

- a) **a Ratio:** It is the ratio of energy between 0-1k Hz, and 1-5 k Hz. Usually energy in speech signal is high in low frequencies and decreases in high frequencies, unless the signal is loaded with higher frequency phonemes. Therefore, it is expected that energy between 0-1 k Hz is higher than that between 1-5 k Hz. Hence a should be higher than 1.
- b) **p Ratio:** It is the energy between 0 2 k Hz and 2-5 k Hz. As explained earlier energy between 0-2 k Hz is higher than that between 2-5 k Hz. Hence P is higher than 1 and is higher than a. p reduces when energy between 2-5 k Hz (as in speakers •; singers formant) increases or that between 0-2 k Hz reduces.
- c) **y Ratio:** y is the ratio of energy between 0-1 k Hz and 5-8 k Hz. Energy between 5-8 k Hz is low compared to that between 0-1 k Hz. Hence y is higher than 1 and is higher than a and B. However, in good projected

voices and speech samples loaded with fricatives (high frequency phonemes) energy between 5-8 k Hz is increased. Hence, y reduces.

Long-term-average-spectra (LTAS) is a very good indicator of the voice quality. Reduced y indicates a good projected voice. Figure 1 shows LTAS of speech signal.

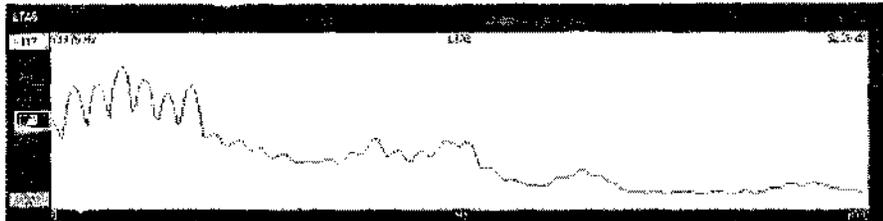


Figure 1: LTAS of a speech signal.

All samples were recorded onto computer using VAGHMI Diagnostic and professional edition (Version: 3.1, Voice and Speech Systems, Bangalore, India) at 16 k Hz sampling frequency. Mean FO (phonation and speaking tasks) and frequency range (speaking task) were measured using VAGHMI software.

Participants' reading samples were recorded onto cassette and transferred onto Cool Edit Pro Software Version 2.0 (Syntrillium Software, USA) at 16 k Hz sampling frequency and 16-bit resolution. Pauses longer than 300 ms and repetition of words in the reading samples were deleted. The FO and frequency range of the edited reading samples were measured on CSL (Computerized Speech Lab, Model 4500, Kay Elemetrics, USA). CSL 4500 was used as VAGHMI could not accept long samples.

Statistical analysis: A commercially available SPSS package (version 10.0.1) was used for statistical analyses. Repeated measure ANOVA was done to find out

significant difference between recordings. A post-hoc Bonferroni's multiple comparisons were used to find out significant difference between each of the recordings. In case Bonferroni's failed to identify significant difference, paired t-test was administered to identify the pairs. Error bar graphs at 95% Confidence Interval for mean were generated to notice the pattern of change for each measure and the variability among participants. Since four of the eight participants received training for five months, only their sixth recording was compared with other recordings using Wilcoxon Signed rank test (Non parametric equivalent to paired t-test) to see significant difference between recordings.

Effect size was determined based on Cohen's d values (Cohen, 1998). Baseline measures and fifth recording measures were considered to measure Cohen's d , and it was calculated as follows,

$$d = M1 - M2 / \sigma_{\text{pooled}}$$
$$\text{where, } \sigma_{\text{pooled}} = \sqrt{[(\sigma_1^2 + \sigma_2^2) / 2]}$$

According to Cohen (1998) if the d value is more than 0.8, 0.4 and 0.2 the effect size is large, medium and small, respectively

Results

A total of 23 subjects enrolled in the training program. However, there was subject attrition and only 8 subjects completed the program. Hence, the results of these 8 subjects will be presented.

1. Fundamental frequency in Phonation

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 1.459, p > 0.05$]. Wilcoxon signed rank test also revealed that there was no significant difference between sixth recording and any other recording at 0.05 level of significance for four participants who received five months of training. The mean F0 in phonation gradually increased from 190.50 Hz in baseline to 203.87 Hz (increased by 13 Hz) in fifth recording. Table 1 shows mean and standard deviation of F0 in phonation of vowel /a/ for five recordings. Figure 2 shows error bar of F0 in phonation.

Recording	Mean (Hz)	S.D.
I	190.50	70.37
II	195.50	71.27
III	199.37	67.37
IV	199.37	70.07
V	203.87	71.50
VI	230.75	64.66

Table 1: Mean and standard deviation of F0 in phonation of vowel /a/.

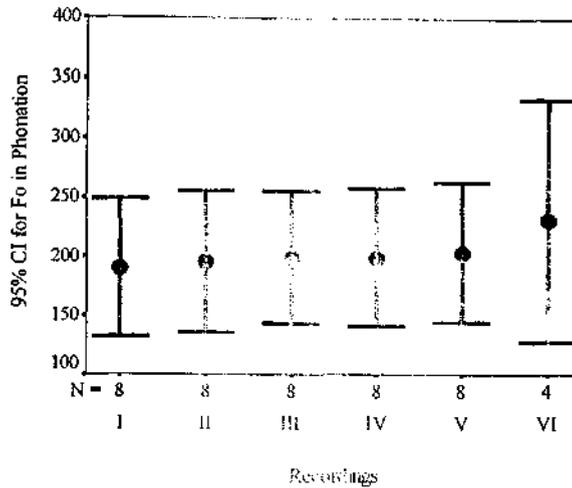


Figure 2: Error bar for F0 in phonation.

2. Frequency range in Phonation

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 1.124, p > (.05)$]. Wilcoxon signed rank test also revealed no significant difference between VI and any other recordings (0.1 level) in four of the participants who received five months of training. There was no discernible pattern of change in mean F0 range in phonation across recordings. Table 2 shows mean and standard deviation of F0 range in phonation for vowel /a/ across five recordings. Figure 3 depicts error bar for F0 range in phonation.

Recording	Mean (Hz)	S.D.
I	7.00	2.09
II	5.99	1.59
III	6.33	2.73
IV	8.31	4.97
V	6.94	2.41
VI	7.99	2.20

Table 2: Mean and SD of F0 range in phonation for vowel /a/ across recordings.

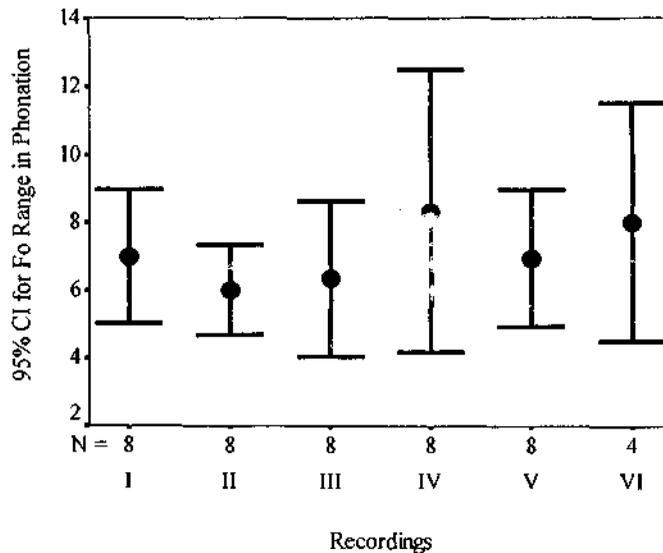


Figure 3: Error bar for F0 range in phonation.

3. Fundamental frequency in speech or speaking fundamental frequency (SFF)

Repeated measure ANOVA revealed a significant difference between recordings [$F(4,28) = 4.685, p < 0.05$]. However, Bonferroni's test failed to identify pairs that are statistically different. Results of paired t-test indicated significant difference between recordings I and III [$t(7) = 2.357,$

$p < 0.1$], and I and V [$t(7) = 2.629, p < 0.05$], Wilcoxon signed rank test also revealed a significant difference between recordings I and VI [$Z(5) = 1.826, p < 0.1$], and II and VI [$Z(5) = 1.826, p < 0.0$]. Mean FO in speech increased from I to V recording (increased by 31.25 Hz), albeit it is not a gradual change. Table 3 shows mean and standard deviation of FO in speech across recordings. Figure 4 shows mean FO values across recordings.

Recording	Mean	S.D.
I	167.25	40.90
II	166.12	38.47
III	197.00	51.99
IV	196.12	49.06
V	198.50	47.93
VI	216.50	45.35

Table 3: **Mean** and standard deviation of F0 in speech across recordings.

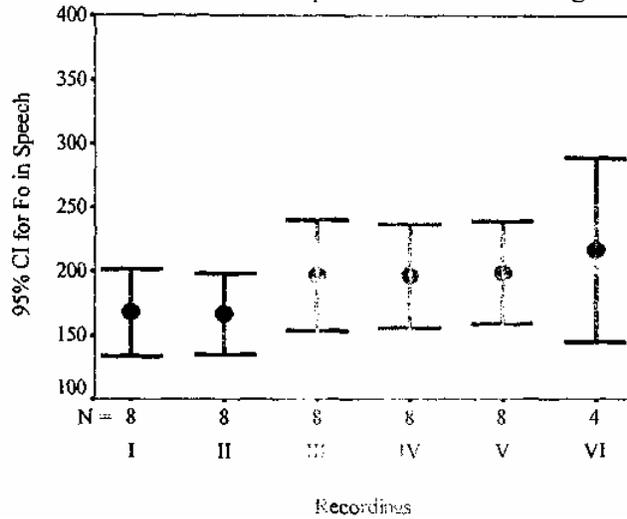


Figure 4: Error bar for F0 in speech

4. Frequency range in Speech

Repeated measure ANOVA revealed a significant difference between recordings [$F(4,28) = 3.277, p < 0.05$]. Results of paired t-test indicated significant difference between recordings I and II [$t(7) = 2.927, p < 0.05$], I and IV [$t(7) = 3.361, p < 0.05$], I and V [$t(7) = 2.979, p < 0.05$], II and III [$t(7) = 2.239, p < 0.1$], and II and IV [$t(7) = 2.008, p < 0.1$]. Wilcoxon signed rank test revealed a significant difference between recordings I and VI [$Z(5) = 1.826, p < 0.1$]. The mean and error bars across recordings are depicted in figure 5 which indicate that F0 range in speech gradually increased from I recording to III recording (increased by 127 Hz) which then gradually decreased till V recording (decreased by 22 Hz). Table 4 shows mean and standard deviation of F0 range in speech across five recordings.

Recording	Mean	S.D.
I	131.75	54.35
II	161.50	108.26
III	258.00	111.68
IV	238.25	113.12
V	236.25	121.55
VI	244.50	97.29

Table 4: Mean and SD in F0 range in speech across recordings.

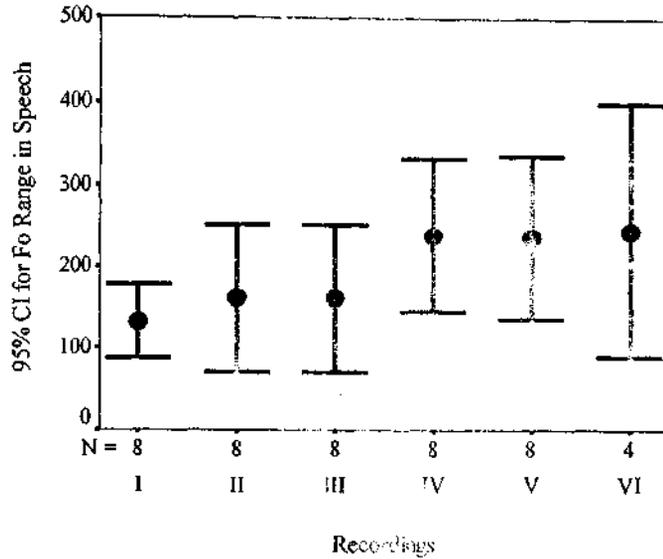


Figure 5: Error bar for FO range in speech.

5. Fundamental frequency in Reading

Results revealed no significant difference between recordings [$F(4,24) = 0.044, p > 0.05$]. Wilcoxon signed rank test also did not reveal any significant difference between recording VI and any other (0.1 level of significance). The mean FO in reading almost remained same across recordings. Table 5 shows mean and standard deviation of FO in reading across five recordings. Figure 6 shows error bar for FO in reading.

Recording	Mean (Hz)	S.D.
I	194.28	60.17
II	192.85	58.41
III	192.71	52.44
IV	192.28	56.33
V	192.00	53.73
VI	203.50	46.40

Table 5: Mean and SD of F0 in reading for all recordings.

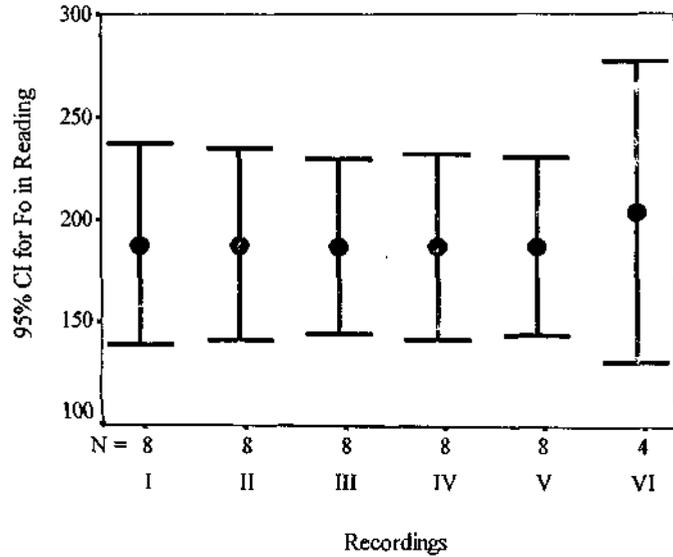


Figure 6: Error bar for F0 in reading.

6. Frequency range in reading

Results indicated no significant difference between recordings [$F(4,24) = 1.971, p > 0.05$]. Wilcoxon signed rank test revealed a significant difference between recording VI and other recordings (0.1 level of significance). The mean frequency range in reading gradually increased from I to V recording (increased by 40.28 Hz). Table 6 shows mean and standard

deviation of frequency range in reading across five recording. Figure 7 shows error bar for frequency range in reading.

Recording	Mean	S.D.
I	274.14	28.71
II	280.42	78.20
III	294.28	68.65
IV	306.42	71.77
V	317.23	67.23
VI	293.25	50.54

Table 6: Mean and SD of F0 range in reading for all recordings.

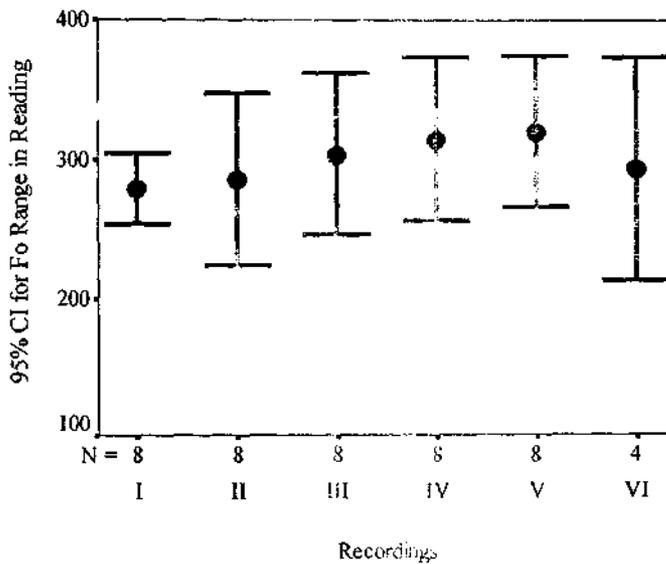


Figure 7: Error bar for F0 range in reading.

7. Intensity in phonation

Repeated measure ANOVA revealed a significant difference between recordings [$F(4,28) = 8.971, p < 0.05$]. Further, Bonferroni's test indicated significant difference between recordings I and IV [$t(7) = 59.00, p < 0.05$].

and I and V [$t(7) = 69.62, p < 0.05$]. Wilcoxon signed rank test revealed no significant difference between recording VI and any other (0.1 level). The mean intensity in phonation gradually increased from I to V recording (increased by 69.25 Hz). Table 7 shows mean and standard deviation of intensity in phonation across five recording. Figure 8 shows error bar for intensity in phonation.

Recording	Mean	S.D.
I	91.25	3.99
II	130.62	38.26
III	133.72	34.97
IV	150.25	32.15
V	160.87	24.50
VI	172.38	6.80

Table 7: Mean and SD of intensity for phonation for all recordings.

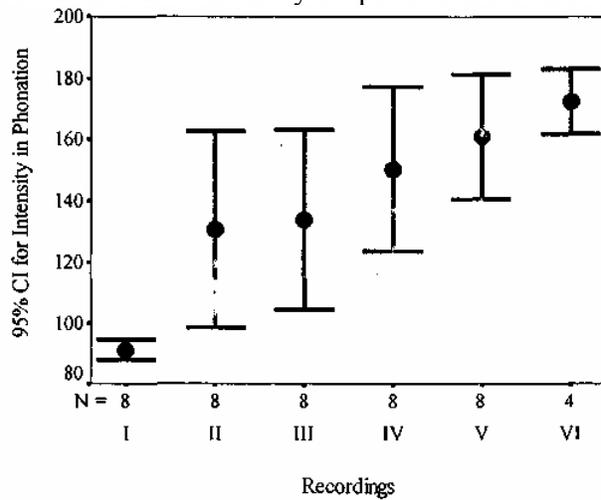


Figure 8: Error bar for Intensity in phonation.

8. Intensity range in phonation

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 0.600, p > 0.05$]. Wilcoxon Signed rank test revealed a significant difference between recordings I and VI [$Z(5) = 1.526, p < 0.1$]. The mean intensity range in phonation did not show discernible pattern and it almost remained same across record Logs. Table 8 shows mean and standard deviation in intensity range in phonation across five recording. Figure 9 illustrates error bar for intensity range in phonation.

Recording	Mean (JB)	S.D.
I	3.750	1.16
II	3.908	0.58
III	3.733	1.89
IV	3.300	0.74
V	3.140	0.82
VI	4.59	1.19

Table 8: Mean and SD of intensity range in phonation across recordings

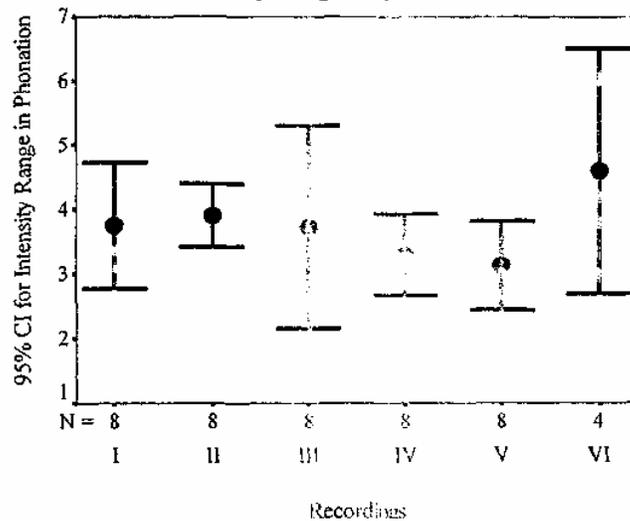


Figure 9: Error bar for intensity range in phonation.

9. Intensity in speech

Results revealed a significant difference between recordings [$F(4,28) = 10.114, p < 0.05$]. Bonferroni's test indicated significant difference between recordings I and IV and I and V. Further, Wilcoxon signed rank test showed significant difference between recording VI and others except recording II (0.1 level of significance). The mean intensity in speech showed gradual increase from I recording to V recording (increased by 52 dB). Table 9 shows mean and standard deviation of intensity in speech across five recording. Figure 10 illustrates error bar for intensity in speech.

Recording	Mean	S.D.
I	93.12	13.35
II	119.12	32.02
III	134.00	29.66
IV	143.40	19.04
V	145.12	20.40
VI	158.25	8.26

Table 9: Mean and SD of intensity in speech (in dB) across recordings.

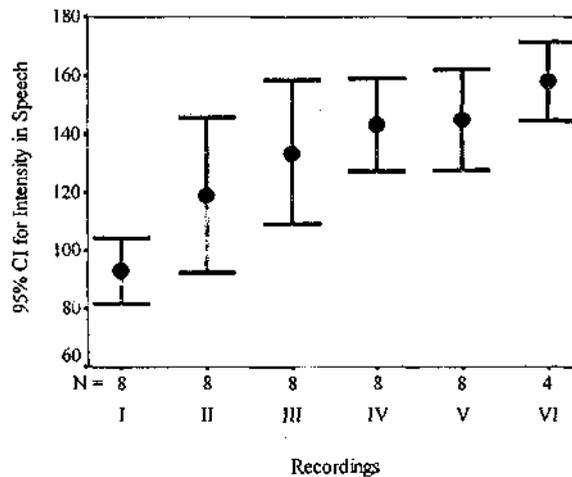


Figure 10: Error bar for Intensity in speech.

10. Intensity range in speech

Repeated measure ANOVA showed a significant difference between recordings [$F(4,28) = 8.132, p < 0.05$]. Bonferroni's test showed significant difference between recordings I and III, I and IV and I and V. Wilcoxon signed rank test indicated a significant difference between recordings I and VI [$Z(5) = 1.826, p < 0.1$]. The mean intensity range in speech showed gradual increase from I to V recording (increased by 13.19 dB). Table 10 show mean and standard deviation of intensity range in speech across five recording. Figure 11 shows error bar for intensity range in speech.

Recording	Mean	S.D.
I	16.50	1.77
II	24.95	8.42
III	29.00	7.44
IV	29.58	4.59
V	29.69	4.55
VI	35.75	3.77

Table 10: Mean and SD of intensity range in speech (in dB) across recordings.

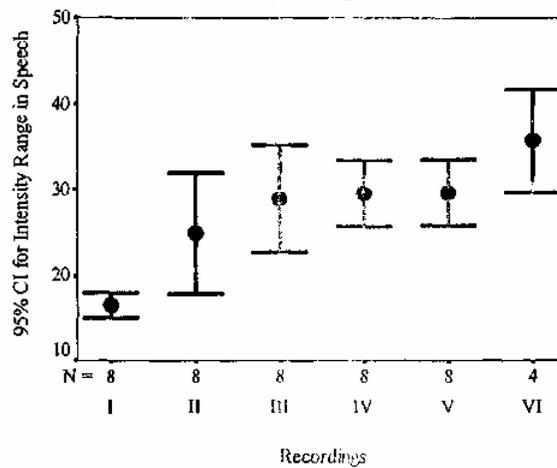


Figure 11: Error bar for Intensity range in speech.

11. Intensity in reading

Repeated measure ANOVA revealed a significant difference between recordings [$F(4,28) = 3.081, p < 0.05$]. Bonferroni's test showed no significant difference between recordings. Hence, paired t-test was used which showed significant difference between recordings I and II [$t(7) = 3.049, p < 0.05$], I and IV [$t(7) = 2.084, p < 0.05$], II and V [$t(7) = 3.001, p < 0.05$] and IV and V [$t(7) = 2.885, p < 0.05$]. Wilcoxon signed rank test revealed a significant difference between recordings II and VI [$Z(5) = 1.826, p < 0.1$]. The mean intensity range in speech did not show a discernible pattern. However, it increased from recording I to recording V (increased by 15 dB). Table 11 shows mean and standard deviation of intensity in reading for five recordings. Figure 12 shows error bar for intensity range in speech.

Recording	Mean	S.D.
I	64.37	13.50
II	60.71	15.27
III	62.00	16.97
IV	61.62	14.81
V	65.87	16.51
VI	61.75	5.90

Table 11: Mean and SD of intensity in reading (in dB) across recordings.

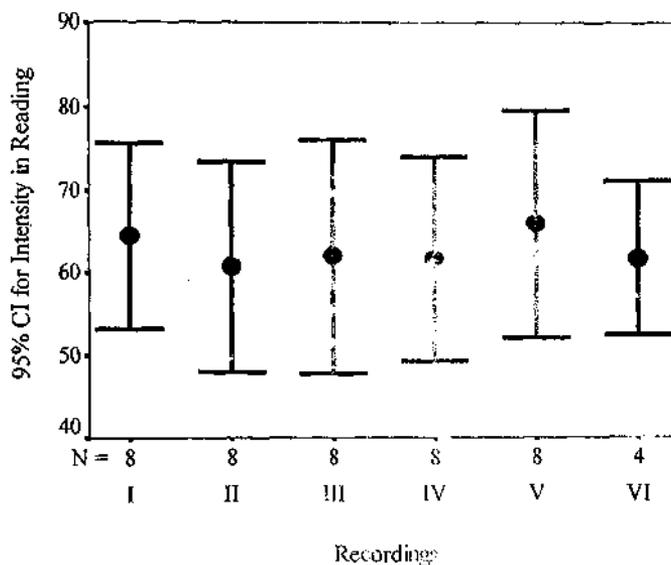


Figure 12: Error bar for intensity in reading.

12. Intensity range in reading

Results showed no significant difference between recordings $fF(4,28) = 1.345, p > 0.05$. Wilcoxon signed rank test also revealed no significant difference between recordings VI and any of the other (0.05 level). The mean intensity range in reading gradually decreased from I recording to V recording (decreased by 9 dB). Table 12 shows mean and standard deviation of intensity range in reading for five recording. Figure 13 shows error bar for intensity range in speech.

Recording	Mean	S.D.
I	49.87	13.10
II	45.00	11.01
III	44.37	7.48
IV	43.00	5.34
V	40.87	4.42
VI	46.75	9.67

Table 12: Mean and SD of intensity range in reading (in dB) across recordings.

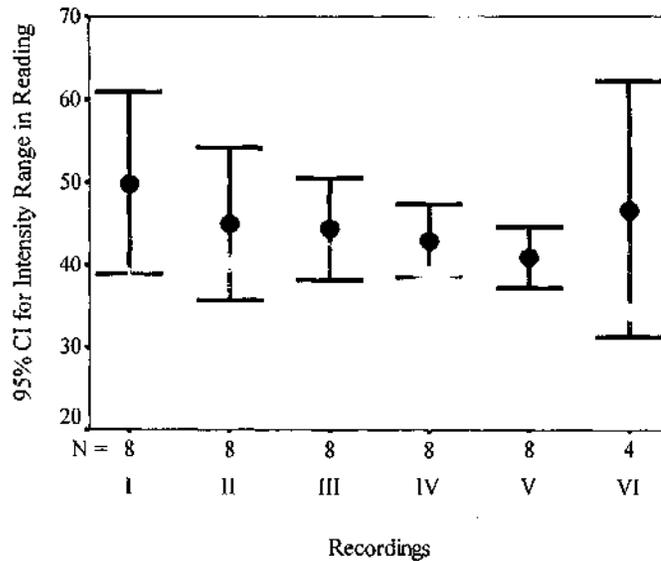


Figure 13: Error bar for Intensity range in reading.

13. Alpha ratio

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 0.444$, $p > 0.05$]. Wilcoxon signed rank test showed significant difference between recordings I and VI [$Z(5) = 1.826$, $p < 0.1$], II and VI [$Z(5) = 1.826$, $p < 0.1$], IV and VI [$Z(5) = 1.826$, $p < 0.1$] and V and VI [$Z(5) = 1.826$, $p < 0.1$]. The mean alpha ratio did not show a discernible

pattern of change. Table 13 shows mean and standard deviation of alpha ratio across five recording. Figure 14 depicts error bar for alpha ration.

Recording	Mean	S.D.
I	14.71	8.33
II	13.88	7.84
III	11.37	5.23
IV	11.97	5.54
V	12.02	7.41
VI	7.00	3.35

Table 13: Mean and SD of alpha ratio.

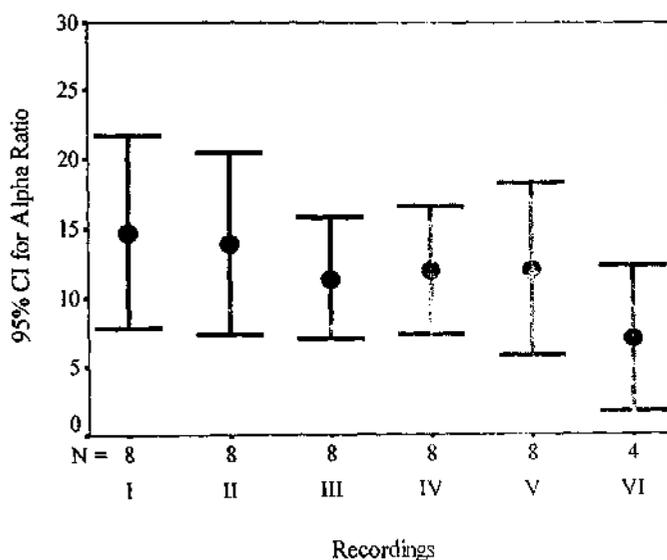


Figure 14: Error bar for alpha ratio.

14. Beta ratio

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 1.450, p > 0.05$]. Wilcoxon signed rank test revealed significant differences between recordings 1 and VI [$Z(5) = 1.826, p < 0.1$], II and VI [$Z(5) = 1.826, p < 0.1$] and IV and VI [$Z(5) = 1.826, p < 0.1$]. The

mean beta ratio did not show a discernible pattern of change. Table 14 shows mean and standard deviation of beta ratio across five recording. Figure 15 shows error bar for beta ratio.

Recording	Mean	S.D.
I	58.36	47.24
II	67.01	47.59
III	38.48	15.01
IV	78.26	54.19
V	51.30	39.71
VI	27.49	20.77

Table 14: Mean and SD of beta ratio across recordings.

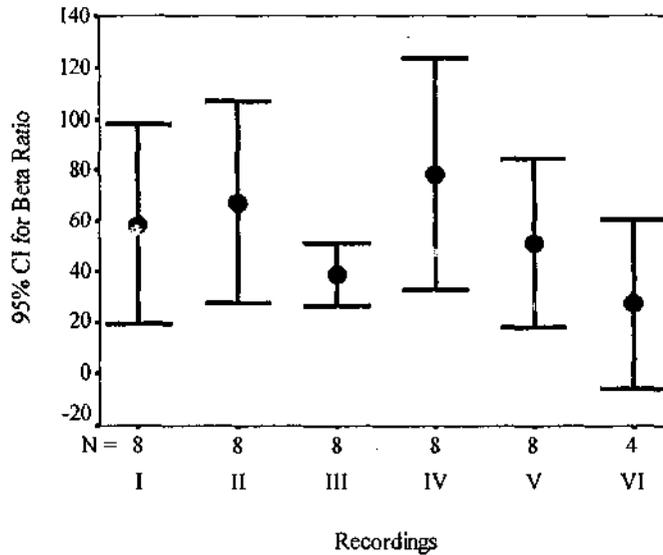


Figure 15: Error bar for beta ratio.

15. Gamma ratio

Repeated measure ANOVA showed a significant difference between recordings [$F(4,28) = 3.345, p < 0.05$]. Since Bonferroni's test failed to

identify recordings that were significantly different, paired t-test was used. Results of paired t-test indicated significant difference between recordings I and III [$t(5)=1.913$, $p<0.1$], I and IV [$t(5)=-1.943$, $p<0.1$], II and III [$t(5)=2.516$, $p<0.05$] and II and IV [$t(5)=-2.528$, $p<0.05$]. Wilcoxon signed rank test showed significant differences between recordings II and I [$Z(5)=1.826$, $p<0.1$] and V and VI [$Z(5)=-1.826$, $p<0.1$]. The mean gamma ratio decreased from I to III (decreased by 5666.1) but increased thereafter till V recording (increased by 1576.67). Table 15 shows mean and standard deviation of gamma ratio across five recording. Figure 16 shows error bar for gamma ratio.

Recording	Mean	S.D.
I	11063.78	8368.33
II	10822.65	5947.25
III	5397.68	2777.28
IV	6124.79	2597.33
V	6974.35	3360.37
VI	4121.38	3120.64

Table 15: Mean and SD of gamma ratio across recordings.

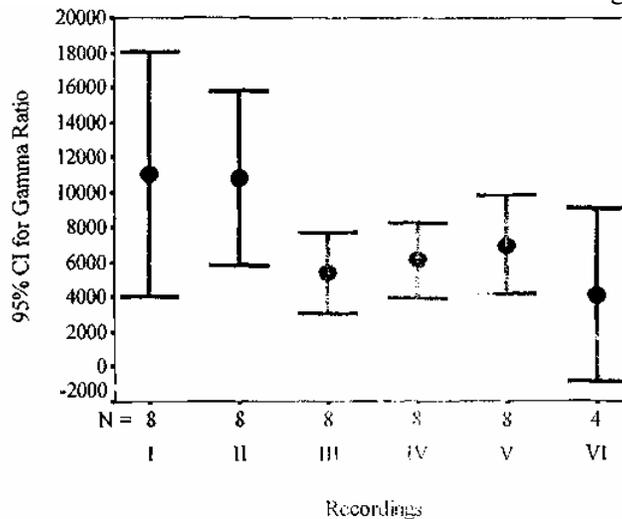


Figure 16: Error bar for gamma ratio.

16. Vital capacity

Results indicated no significant difference between recordings [F(4,28) - 1.956, $p > 0.05$]. Wilcoxon signed rank test revealed significant differences between recordings IV and VI [Z(5)=1.826, $p < 0.1$]. Mean vital capacity values across five recordings increased from recording I to V, though not consistently. Table 16 shows mean and standard deviation of vital capacity across five recordings. Figure 17 shows error bar for vital capacity.

Recording	Mean	S.D.
I	2.70	0.51
II	2.76	0.60
III	2.75	0.59
IV	2.84	0.45
V	2.89	0.51
VI	2.71	0.28

Table 16: Mean and SD of vital capacity (in liters) across recordings.

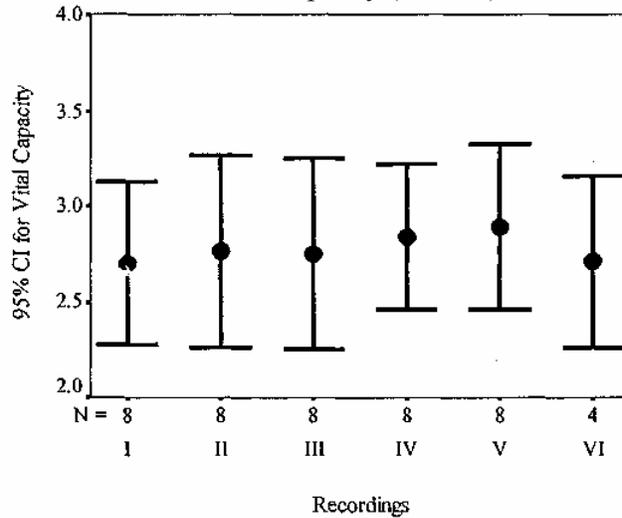


Figure 17: Error bar for vital capacity.

17. Mean airflow rate (MAFR)

Repeated measure ANOVA revealed a significant difference between recordings [$F(4,28) = 3.289, p < 0.05$]. Bonferroni's test indicated significant difference between recordings II and V. Wilcoxon signed rank test revealed significant difference between recordings VI and I [$Z(5) = 1.826, p < 0.1$]. The mean MAFR decreased from recording I to V, though not consistently. Table 7 shows mean and standard deviation of mean airflow rate across five recordings. Figure 18 depicts error bar for mean airflow rate.

Recording	Mean	S.D.
I	155.03	34.96
II	150.09	20.33
III	133.53	19.96
IV	138.45	16.98
V	134.12	22.37
VI	129.06	23.55

Table 17: Mean and SD of mean airflow rate (in ml/sec) across recordings.

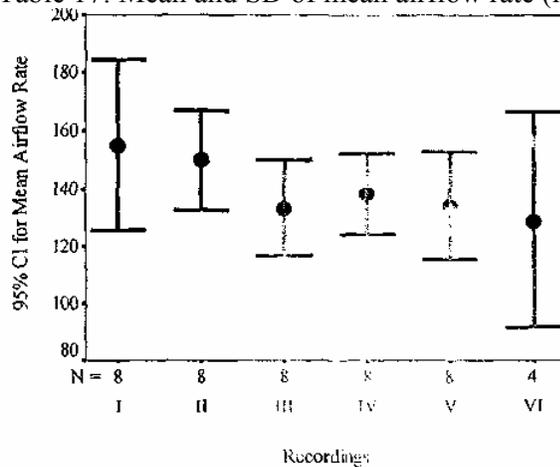


Figure 18: Error bar for mean airflow rate.

18. Maximum phonation duration (MPD) of vowel /a/

4

No significant difference between recordings [$F(4,28) = 1.644, p > 0.05$] were noticed. Wilcoxon signed rank test revealed significant differences between recordings I and VI [$Z(5) = 1.826, p < 0.1$], III and VI [$Z(5) = 1.841, p < 0.1$] and IV and VI [$Z(5) = 1.841, p < 0.1$]. The maximum phonation duration for vowel /a/ increased from recording I to V, though not consistently. Table 18 shows mean and standard deviation of maximum phonation duration for vowel /a/ across five recordings. Figure 19 depicts error bar for maximum phonation duration for vowel /a/.

Recording	Mean	S.D.
I	15.32	3.00
II	16.25	2.60
III	16.56	3.65
IV	15.56	2.79
V	16.37	2.76
VI	18.12	1.93

Table 18: Mean and SD of MPD of vowel /a/ ("in seconds") across recordings.

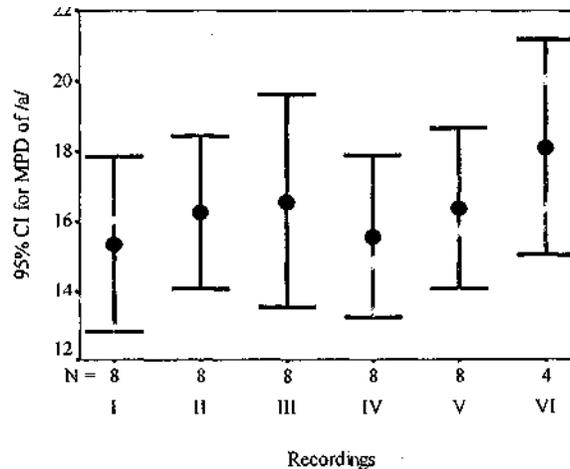


Figure 19: Error bar for MPD of vowel /a/.

19. Maximum phonation duration of vowel /i/

Repeated measure ANOVA revealed no significant difference between recordings [$F(4,28) = 0.891, p > 0.051$]. Wilcoxon signed rank test also revealed no significant difference between recordings VI and any other (0.1 level). The mean phonation duration for vowel /i/ did not show discernible trend across recordings. Table 19 shows mean and standard deviation of maximum phonation duration for vowel /i/ across five recording. Figure 20 shows error bar for phonation duration for vowel /i/.

Recording	Mean	S.D.
I	17.93	3.82
II	17.50	4.20
III	16.87	2.94
IV	18.68	4.05
V	17.87	3.18
VI	16.87	9.60

Table 19: Mean and SD of MPD of vowel /i/ (in seconds) across recordings.

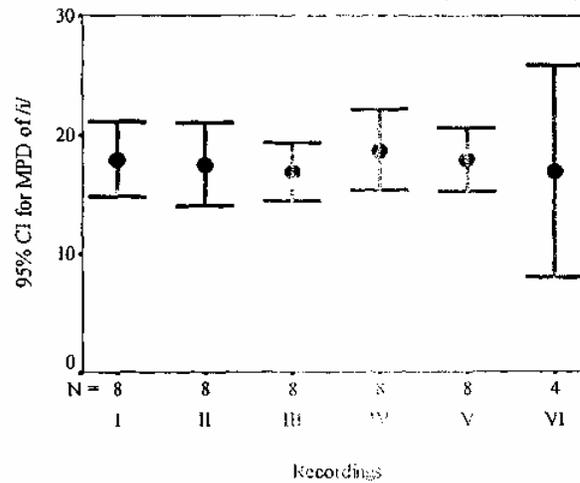


Figure 20: Error bar of MPD of vowel /i/.

20. Maximum phonation duration of vowel /u/

Results showed no significant difference between recordings [$F(4,28) = 0.526, p > 0.05$]. Wilcoxon signed rank test showed significant difference between recordings I and VI [$Z(5) = 1.841, p < 0.1$] and II and VI [$Z(5) = 1.826, p < 0.1$]. The mean phonation duration for vowel /u/ did not show discernible trend across recordings. Table 20 shows mean and standard deviation of maximum phonation duration for vowel /u/ across five recordings. Figure 21 shows error bar for phonation duration for vowel /u/.

Recording	Mean	S.D.
I	17.12	3.31
II	17.06	3.62
III	17.56	3.04
IV	17.87	3.75
V	17.25	4.26
VI	19.62	4.30

Table 20: Mean and SD of MPD of vowel /u/ (in seconds) across recordings.

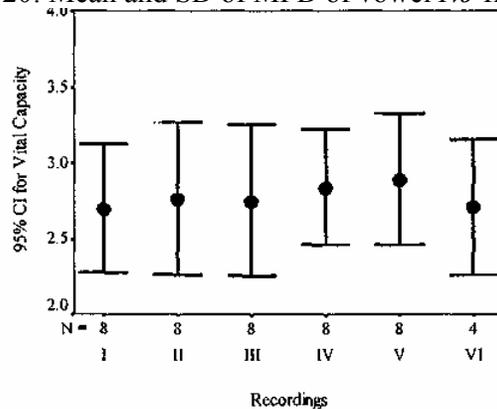


Figure 21: Error bar of MPD of vowel /u/.

21. Rate of speech (in words per minute - WPM)

Repeated measure ANOVA showed no significant difference between recordings [$F(4,28) = 1.352, p > 0.05$]. Wilcoxon signed rank test showed significant difference between recordings III and VI [$Z(5) = 1.876, p < 0.1$]. WPM did not show any consistent trend across recordings. However, WPM in recording V was reduced compared to recording I. Table 21 shows mean and standard deviation of rate of speech across five recordings. Figure 22 shows error bar for rate of speech.

Recording	Mean	S.D.
I	136.14	38.01
II	117.71	16.23
III	120.81	12.45
IV	116.09	12.97
V	117.08	14.82
VI	108.11	10.29

Table 21: Mean and SD of rate of speech (in WPM) across recordings.

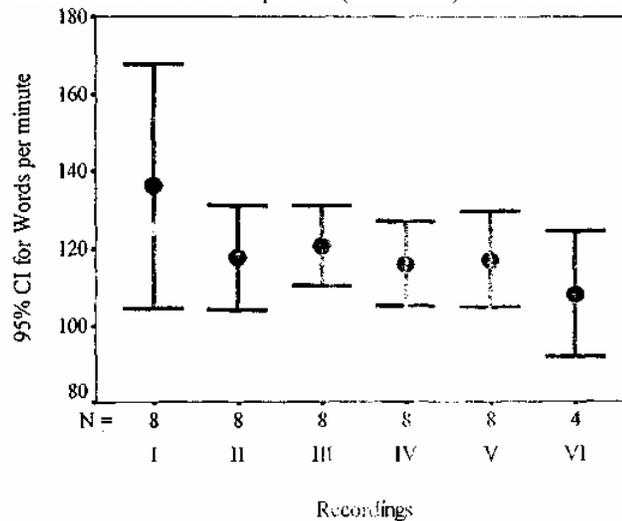


Figure 22: Error bar for rate of speech (WPM).

As some of the participants were faster and some slower in their rate of speech at baseline (as compared with the norms by Savithri and Jayaram, 2005), unlike the other parameters rate of speech was evaluated individually.

Participant 1 and 2 were Tamil speakers (normal speaking rate is 135 ± 25). Participant 1 exhibited 103.97 wpm and participant 2 exhibited 225.92 (fast rate of speech) wpm as their speaking rate. Following training they showed 108.92 and 93.36 wpm respectively falling in lower end of the normal speaking rate.

Participants 3,4,5,6 and 7 were Kannada speakers (normal rate of speech for their age is 116 ± 21 wpm). Except participant 5 who continued to show high rate of speech rest other participants showed normal rate of speech at final recording.

Participant 8 was Telugu speaker (normal rate of speech for their age is 133 ± 20 wpm). Participant 8 showed normal rate of speech in his baseline and also on final recording. Figures 24 to 31 show the pattern of change across recordings in rate of speech for eight of the participants.

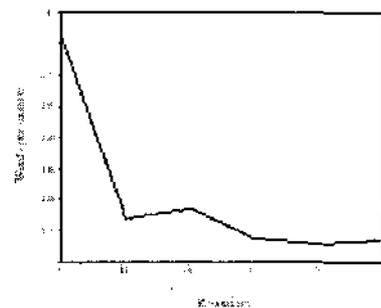
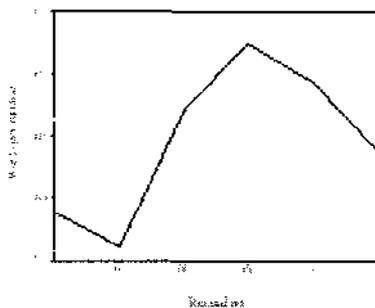


Figure 24: Rate of speech for participant 1. Figure 25: Rate of speech for participant 2.

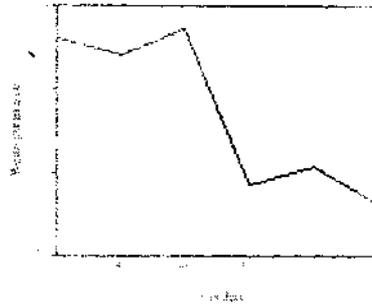


Figure 26: Rate of speech for participant 3. Figure 27: Rate of speech for participant 4.

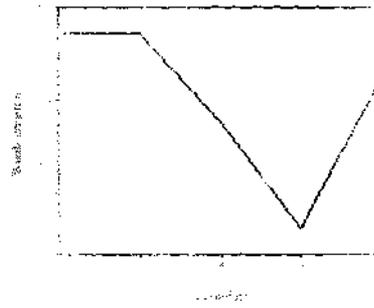
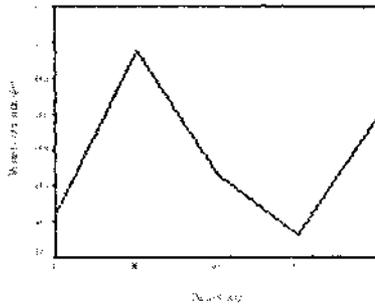


Figure 28: Rate of speech for participant 5. Figure 29: Rate of speech for participant 6.

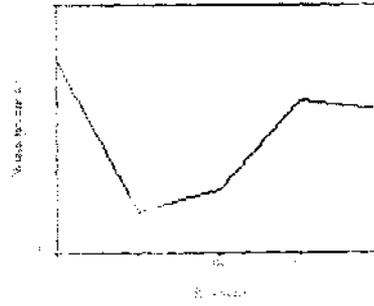
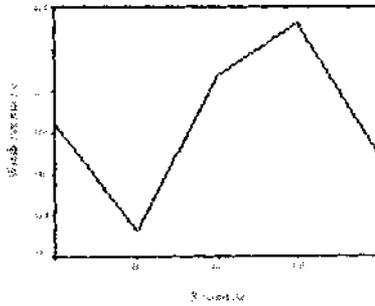


Figure 30: Rate of speech for participant 7. Figure 31: Rate of speech for participant 8.

In summary, the parameters that showed significant increase are FO in speech, FO range in speech, Intensity in phonation, speech and reading and intensity range in speech. The parameters that showed significant decrease are Gamma ratio and MAFR.

22. Effect size

The training improved certain measures in participants. The parameters that showed large effect size (Cohen's $d > 0.8$) included FO range in speech, intensity in phonation and speech, and intensity range in speech and reading. Medium effect size (Cohen's $d > 0.5$) was noticed on FO range in reading, mean airflow rate, rate of speech, gamma ratio, and intensity range in phonation. Small effect size (Cohen's $d > 0.2$) was noticed on vital capacity, MPD of /a/ and alpha ratio. Figure 32 shows effect size on various parameters. Dots in the figure indicate that the parameter is statistically significant.

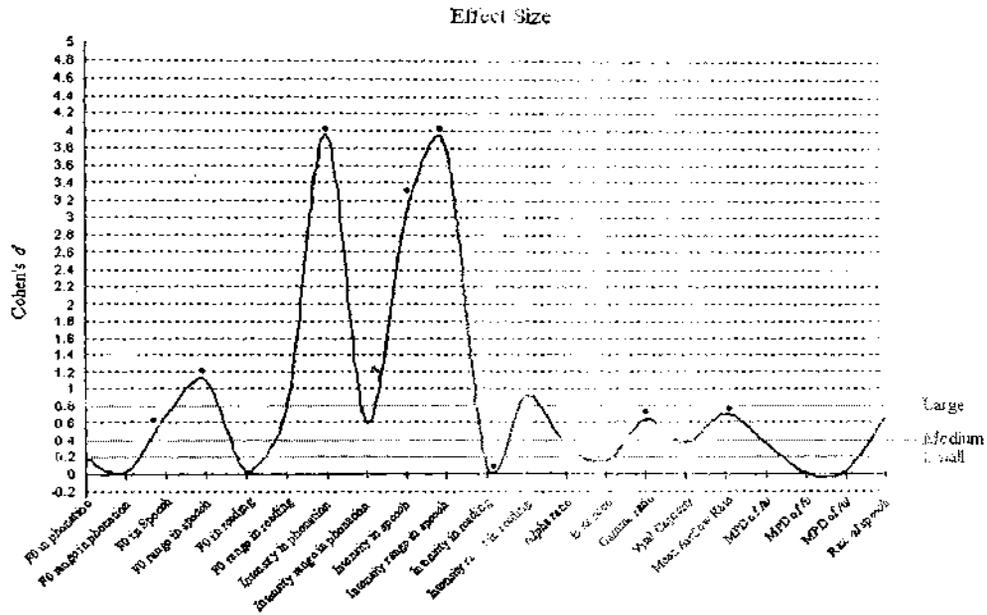


Figure 32: Effect size.

Discussion

The results of the study showed several points of interest. First of all, all participants had increased fundamental frequency and frequency range in speech across sessions and the increase was statistically significant. The results of the project support findings of Kovacic & Budanovac (2002) that speaking fundamental frequency (SFF) and speaking range significantly improved with training. Greater speaking range is desirable in making speech interesting. In the present study F0 in speech increased by 31.25 Hz and F0 in phonation increased by 13 Hz. Increase in F0 in spiking task was higher than that in phonation. Also, F0 range in speaking task was 112 Hz larger than that in phonation task. These results agree with that of Borrego, Gasparini & Behlau (2006) who demonstrated increased pitch range of the participants was also shown with radio announcers.

Second, intensity improved in all the three tasks. However, intensity range improved only in speech task. This means that the participants are louder in final recording compared to baseline but their vocal dynamicity improved only in speaking task.

Third, of various LTAS measures considered, only y ratio decreased. This is an indicative of increased energy in the high frequency region, a condition present in projected voice (Rachel & Jennifer, 2005) and resonant voice (Cara, Eileen, & Micheal, 2004).

Fourth, results also show that total lung volume (vital capacity) did not increase but mean airflow decreased with training. This means that the participants in the study are exhibiting efficient airflow with the same amount of air. The finding that increased energy in the high frequency region and decreased glottal airflow

supports earlier finding with greater projected voice (William, Eileen & Micheal, 2000).

Fifth, there was no significant change in maximum phonation duration of any vowel. This result is in agreement with the result that the vital capacity did not increase with training. One would have expected increase in maximum phonation duration with increase in vital capacity. The results suggest that the exercises to improve respiratory capacities were not sufficient..

Sixth, no parameter showed unidirectional change. Most of the parameters showed change in direction of improvement, which could be because of two reasons. Firstly, the training was conducted chapter by chapter. Therefore, participants have received training on particular aspect for certain duration only. Once, the exercises in a chapter were mastered, only selected exercises were continued for further practice. This rigorous training on an aspect for certain period resulted in better measurement in the following recording. Secondly, the regularity in attending training program decreased with time. Therefore, participants have received more number of sessions in the initial months than later. This unequal number of training sessions also might have resulted in varied performance of the participants.

The parameters that showed desirable changes in eight participants who received four months of training were speaking fundamental frequency, frequency range in speech, intensity in phonation, speech and reading, intensity range in speech, y ratio, and mean airflow rate. Importantly, the above parameters improved with most significant difference ($p < 0.05$). Interestingly, both absolute and range in frequency and intensity improved in speech but not phonation or reading. This is

possible as the training material was speech and the carry over effect was greater for speech tasks compared to other two tasks.

Although the training was provided in speech and reading tasks, the carry over effect onto phonation task was seen with intensity than with frequency. This is further supported by the fact that the development in intensity in speech and phonation mimic. Although some parameters improved in their final recording compared to that of baseline, it was not identified by statistical test. For example, frequency range in reading, Vital capacity. This could be due to high inter subject variability, which can be seen as the width of the vertical line in error bar. The factors that could have contributed to varying results are non-homogenous participants, irregular attendance and number of training sessions attended. In general, standard deviation was high in all the parameters. A possible explanation for this is that the training was helpful in different participants to varied extent. Finally, the written testimonies from the participants reveal that the training was helpful to them in making themselves audible and their friends report that their voice sounds "good" now.

Summary and Conclusions

Although everyone cherishes for projected voice, there seems to be lack of training material to improve the same. The present project aimed at devising training material for voice projection and also tests the same for its efficacy. Although there were many enrollments, only 8 participants could continue training program for 5 months. The participant's baseline and periodical recording after every month was done for phonation, speech and reading tasks. The data was analyzed for frequency and intensity related parameters, LTAS parameters, vital capacity, mean airflow rate, maximum phonation duration and rate of speech.

It can be concluded from the results that the *training effect* was **remarkable** in intensity and frequency related parameters, y ratio, and aerodynamic measures that showed improvement with training. However, the improvement was not gradual and not to the same extent in all the participants. This indicates that there exist individual related factors that influence the improvement. A future study to examine these factors is suggested. And also, long term follow-up is required to find out if the results of the voice training program maintain. The manual prepared for the project can be used as a self-guide by individuals for improving their vocal projection.

References

- Alderson, R. (1979). *Complete handbook of vocal training*. West Nyack, N Y: Parker Publishing company Inc.
- Borrego, M. C, Gasparini, G., & Behlau, M. (2006). Effects of a specific speech and language training program on students of a radio announcing course. *Journal of Voice*, April 25, 2006.
- Cara, G. S., Eileen, M. F., & Micheal, P. K. (2004). Resonant voice: Spectral and Nasendoscopic analysis. *Journal of Voice*, 19(4), 607-622.
- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd Edn.). Hillsdale, NJ: Erlbaum.
- Cranell, K. C. (2000). *Voice and articulation*. California. Wadsworth Thomson Learning.
- Kovacic, G., & Budanovac, A., (2002). Acoustic characteristics of adolescent actors' and non-actors' voices. *Folia Phoniatica et Logopaedica*, 54, 125-132.
- Rachel, P. & Jennifer, O. (2005). Vocal projection in actors: The long-term average spectral features that distinguish comfortable acting voice from voicing with maximal projection in male actors. *Journal of Voice*, 19(3), 440-453.
- William, C. T., Stephen, J. C, Janice, C. & Pamela, J.D. (2000). Patterns of breath support in projection of the singing voice. *Journal of voice*, 15(1), 86-104.

Appendix I: Manual on Effect of Training on Voice Projection



Department of Speech-Language Sciences
All India Institute of Speech & Hearing
Naimisham Campus, Manasagangothri
Mysore 570 006

Chapter	Title	Page No.
I	Introduction	iii-iv
II	Speech production	v-xii
III	Respiration and breathing exercises	xiii-xxviii
IV	Pitch and its exercises	xix-xxxviii
V	Resonance and its exercises	xxxix-xxxj
VI	Voice quality and its exercises	xxxix-'i
VII	Voice projection and its exercises	lii-Jiii
VIII	Rate of speech and its exerciser	liv-lviiij
IX	Articulation and its exercises	lix-lxxiv
	Short listed exercises for daily practice	lxxv- lxxxiv

Chapter I: Introduction

The difference between management and leadership is communication.

Winston Churchill

The above sentence is well said. It's the communication abilities that make difference in to a person.

Project

The project on *effect of training on voice projection* is about collecting, testing various exercises that are proposed to improve the systems that are involved in speech production. The exercises are demonstrated, practiced and tested for its usefulness through various acoustic measures.

Purpose

The purpose of the project is to develop a self-explanatory manual on voice projection skills. It involves collecting various exercises pertaining to voice projection and evaluating the efficacy of it.

Outcomes

The primary outcome of the project is a self-explanatory manual that would instruct an individual to improve their voice projection skills. The secondary outcome is the efficacy measure of the program used in the project.

Exercises

The practice exercises are on pitch, loudness, voice quality, projection (all the above would eventually improve voice projection), rate of speech and articulation. The exercises improve the functioning of speech mechanism, which is vital for voice projection.

Benefits

The participant at the end of the course will be an efficient user of voice. Efficient voice usage means having greater effect of voice with minimal effort.

Risks

The project involves no known risks in it.

Measurements

To track down the changes in voice projection the following acoustic and aerodynamic measure are selected:

Aerodynamic measures

Vital capacity (VC)

Mean air flow rate (MAFR)

Acoustic measures

Fundamental frequency

Fundamental frequency range in phonation,
speech and reading

Loudness

Loudness range in phonation, speech and reading

Maximum phonation duration (MPD)

Rate of speech during speaking and reading

Long-term average spectra (LTAS)

Chapter II: Speech production

What is speech?

Speech is a form of communication the other forms being writing and signing. Speech is the ultimate sound that we hear but it involves many complex yet coordinated acts. Speech production begins with the idea as to what to speak and ends with articulation of speech sounds, words and phrases.

What are the systems involved in speech production?

Speech production is an integrated action of nervous system, respiratory system, laryngeal system, articulatory system and resonatory system. The orientation of different organs involved in speech production is illustrated in figure 2.1. As seen in figure stomach, diaphragm and lungs consist of respiratory system; larynx is a part of phonatory system; vocal tract (starts from vocal cords below and extends up to mouth) is a part of resonatory system.

Nervous system

Nervous system controls all the body actions. Nervous system consists of brain and nerves that convey commands from brain to different body parts. The brain has different sections called lobes. The frontal lobe of the brain controls speech. The commands from frontal lobe are conveyed to speech organs by nerves. Any damage in either brain or nerves will result in affected speech. For example, in case of paralysis, due to inability of either nerve to carry commands or the muscles to act accordingly, the correct production of speech is affected.

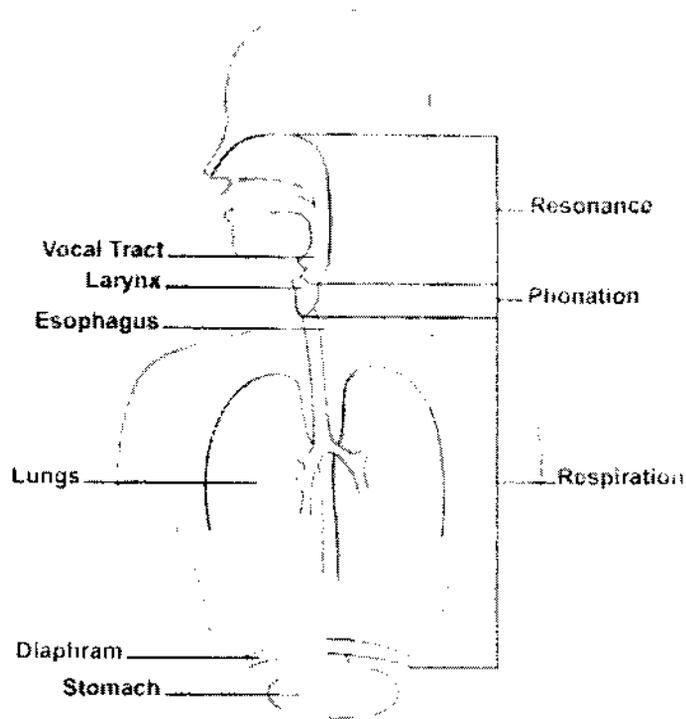


Figure 2,1: Orientation of different organs in body that are involved in speech production,

Respiratory system

Like any engine, human body runs on fuel, the fuel for the body is blood, and oxygen in the blood. Oxygen is taken into blood by the process of respiration. Taking air into the lungs is called inhalation or inspiration and expelling air out is called expiration or exhalation. During relaxed breathing one usually inhales and exhales about a dozen (12) times per minute. This rate of breathing (breathing cycles) increases as one is involved in physical activity of speech.

Two lungs are important organs in breathing or respiration. Lungs are attached to ribs all around and rest on a dome-shaped muscle called diaphragm. Air enters lungs when the air pressure in the lungs is less than the environment pressure.

The negative air pressured lungs draw air from outside environment through nose and/or mouth. This negative pressure in lungs can be created in three ways,

- i. By pulling the ribcage outward and upward, the lungs are expanded in front to back direction creating negative air pressure in lungs, Breathing by this kind mechanism is called "thoracic breathing",
- ii. By contraction of the diaphragm the lungs are expanded longitudinally creating negative pressure. Breathing by this kind mechanism is called "diaphragmatic breathing".
- iii. Raising the thorax up by the muscles that are attached to clavicle or collar bone can also create negative pressure. Breathing by this kind of mechanism is called "clavicular breathing".

Among the three kinds, diaphragmatic breathing is advised as it can accommodate much air compared to other kinds, which is necessary for continuous, lengthy and loud speech. And also, diaphragmatic breathing does not cause any tension in larynx, voice box like the other kinds. In figure 2,2, the lungs are simulated with balloons. As can be seen, the balloons are inflated (blown) (as in 'b') when negative pressure is created in the cylinder by pulling down the base,

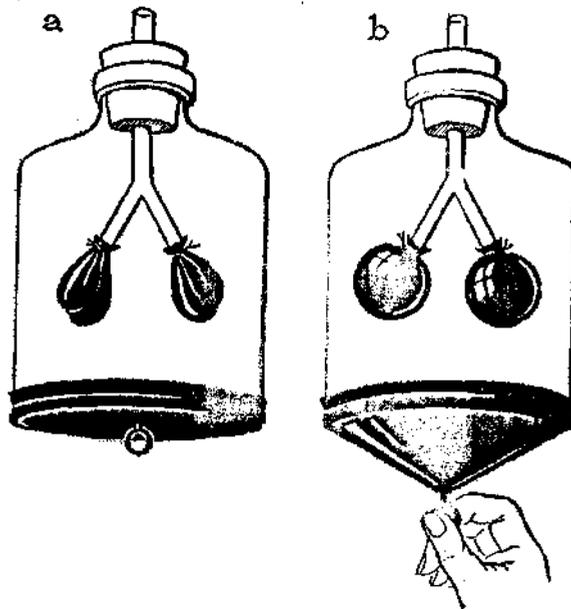


Figure 2.2: Illustration of inflation of balloons (simulated for lungs) (a) Normal resting balloons and (b) When negative pressure is created in the cylinder.

Laryngeal system

The laryngeal system is located within neck. It consists of cartilages and muscles. Different muscles are attached to cartilages. The primary muscle that is responsible for voice production is pair of vocalis muscle (also called as vocal cords). Vocal cords are placed horizontally at the level of Adam's apple. Vocal cords are fixed anteriorly and flexible to move on the posterior side with the help of pair of movable arytenoid cartilages.

Prior to initiation of voice the two vocal cords move towards each other thus obstructing the air passage. The obstruction of air results in increase in pressure beneath the vocal cords called sub glottal pressure. As the sub glottal pressure gradually increases and reaches a level (approximately 3 mm H₂O) when it can

set the vocal cords apart, a puff of air is released. And the vocal cords are closed again to block the air; this cycle repeats resulting in release of puffs of air. When heard, the puffs of air sounds like a musical note played on an instrument. The number of puffs per minute determines the frequency of voice. In other words, frequency is related to the number of times the vocal cords slam with each other or the average number of puffs released per second. These series of puffs of air sounds like a musical note played on a string instrument. This needs to be shaped into desired speech sounds and also amplified. Figure 2.3 shows larynx and figure 2.4 illustrates voicing.

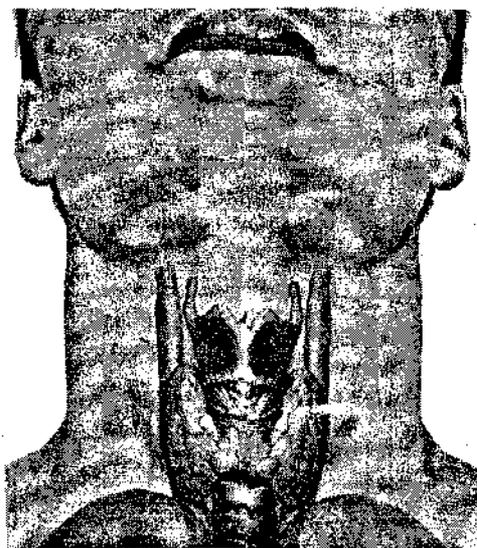


Figure 2.3: Illustration of laryngeal system.

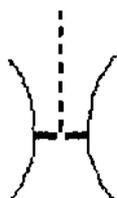


Figure 2.4: Schematic illustration of voicing.

Articulatory system

The voice generated at the level of the vocal cords needs to be modified into meaningful speech sounds. Articulatory system modifies the voice by the rapid movements of the various articulators such as tongue, lips, soft palate (flap like structure hanging at the back of the mouth, and raises on saying "ah") and lower jaw as movable articulators and upper jaw, hard palate (rigid bone forming the roof of the mouth) as immovable articulators. The articulators move so fast that we are able to produce 4-6 syllable (combination of vowel and a consonant e.g., /pa/, /ba/, /ma/ and /na/) per second. Each articulator not only moves with individual precision but also in coordination with other articulators. A good example for coordinated activity of different articulators is seen during the production of "s" in the word *school*. During the instance of "s" production observe that the lips are rounded that is required for the production of the following vowel "u".

A good articulation is characterized by precise and coordinated articulation. Figure 2.4 illustrates the articulatory system.

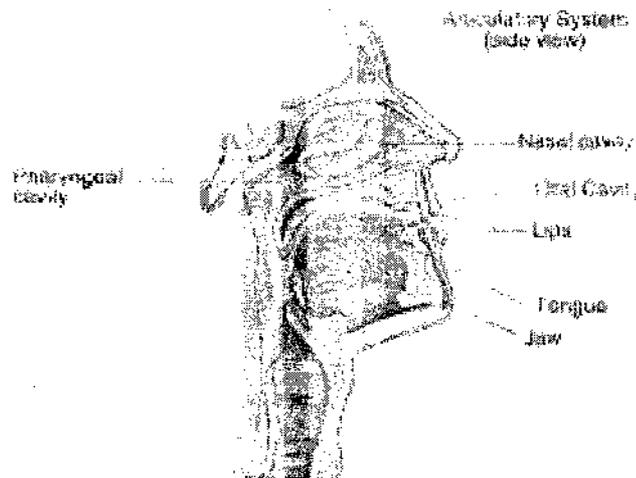


Figure 2.5: Articulatory system.

Resonatory system

Any feeble sound needs amplification in order to be heard. For example, a violin string when it is plucked generates a weak signal. The weak signal is amplified by the cavity below the strings. But, when we pluck the same strings in on open air the same signal is perceived soft owing to the absence of resonating cavity. Therefore, a cavity is important to strengthen any feeble sound.

As discussed earlier, the voice produced at the level of larynx is feeble and needs amplification. The cavities within in the mouth and nose act as resonators that amplify (strengthen or louder) the sound. The strengthening or intensification of the sound depends on the volume of cavity *in* mouth (oral cavity) and nose (nasal cavity). The volume depends on the opening of the mouth. As you can observe that the vowel /a/ sounds muffled when you say with clinched mouth and louder and clear with wide-open mouth. Larger the volume louder is the sound. The oral cavity amplifies all the sounds other than nasal sounds (nasal sounds are 'm', 'n', 'ng'). Nasal sounds can be identified as vibrations are felt on the nose during their production in normal individuals.

What are the components of speech?

The components of the speech include voice, articulation and fluency.

Voice

Voice is what is produced at the level of larynx. It sounds like a pure tone or a note produced on violin.

Articulation

Articulation pertains to modification of voice into desired speech sounds by the rapid and coordinated movements of the articulators.

Fluency

The continuity and rate of speech determines fluency of speech.

What is normal speech?

A normal speech is one that has normal voice, articulation and fluency and matches with many of the speakers of his/her gender and age.

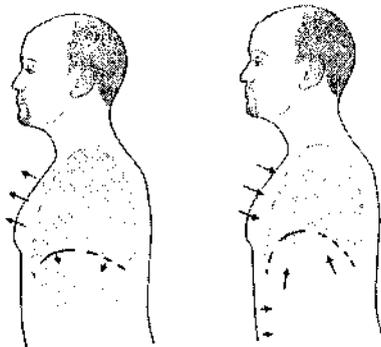
Chapter III: Respiration and breathing exercises

What is respiration?

Respiration is a biological process where by gas exchange takes place. The impure carbon dioxide from the blood is exchanged with environmental pure oxygen in the lungs. Although respiration is meant for primary biological functions, it is also helpful in voice production. The air coming out of lungs is modified into puffs of air (the sound at this level is called voice) by the vibratory action of the vocal cords. The respiratory support is important not only in initiation of voice but also in making variations in voice. In other words, air supply for speech is analogous to petrol/fuel for a vehicle.

What are the types of respiration?

The function of taking air in is possible primarily through three ways, thoracic, abdomen and diaphragmatic breathing. While thorax (chest) and neck muscles are involved in thoracic type of breathing, abdomen (stomach) muscles are involved in abdomen breathing. Figure 3.1 illustrates all two types of breathing.



Thoracic breathing



Abdominal breathing

Figure 3.1: Thoracic and abdominal breathing.

What is normal and recommended breathing pattern for speech purposes?

Diaphragmatic breathing employs stomach muscles and is the suggested breathing pattern especially for speech purposes as it can accommodate larger amount of air than the other two types of breathing.

What is the minimum air pressure required^f or initiation of voice?

The minimum air pressure required to set the vocal cords into vibration is called sub glottal pressure threshold and it is approximately 3 mm H₂O. The required sub glottal pressure varies with the task. For instance, for loud speech like in shouting, yelling a minimum of 6 mm H₂O is required.

What is vital capacity?

Vital capacity is the total volume of air that can be exhaled after deep inhalation. Vital capacity varies with age, gender and profession (singers and stage show performers show greater vital capacity). Measuring vital capacity is important to understand the total air that is available for speech.

What is normal vital capacity?

Normal adult male would have a vital capacity of approximately 2500 cc. Normal adult female would have a vital capacity of approximately 1500 cc.

When is vital capacity reduced?

Abnormal or reduced vital capacity can be resultant of either incorrect type of breathing (thoracic or clavicular breathing) or some respiratory pathologies such as bronchitis, asthma etc. When vital capacity is reduced, a person is unable to speak longer and louder sentences.

What is Mean Air Flow Rate?

The average amount (volume) of air that passes through the vocal cords per unit time is called mean airflow rate. Mean airflow rate depends on the stiffness/slackness of the vocal cords. A stiff vocal cord will not allow the air to pass through freely thus increased mean airflow. Whereas a slack vocal cord allows air to pass through freely.

What is normal Mean Air Flow Rate?

The normal mean airflow rate ranges from 80 cc/sec to 180 cc/scc. However this varies with the nature of the speaking tasks, for instance, in loud speaking the airflow rate is high compared to that in soft speaking.

What is Maximum Phonation Duration (MPD)?

Maximum phonation duration is the time period for which a person can sustain saying "ah" following deep inhalation.

What is normal Maximum Phonation Duration?

Average maximum phonation duration is 15 to 20 sec for adults. It is less in case of children that is between 10 and 15 sec. Phonation duration is longer in singers and swimmers.

When is Maximum Phonation Duration reduced?

Phonation duration is reduced when sufficient expiratory air is not available or the vocal folds are not closing properly.

Check your Vital capacity, Mean Air Flow Rate and Maximum phonation duration

	YOU	REFERENCE
VC		1500 cc (for female) 2500 cc (for male)
MAFR		80-180 cc/sec
MPD		15 sec

What are the breathing exercises?

The following exercises are geared towards increasing respiratory support for speech.

Exercise 1: Watching: Watch at yourself in a mirror or simply look down at the chest/torso area and observe the movements that occur during breathing. If you are in a group observe other's breathing pattern. Observe for the following:

1. What movements occur in your chest when you breathe in?
(If chest moves in and out when you breath there is a need to correct it because in model abdominal breathing chest has little role to play)
2. What movements occur in your lower abdomen (tummy) when you breathe in?
(In suggested breathing pattern thai is abdominal breathing it bulges out when you breathe in. If you do not observe this there is a need to change your breathing pattern with exercise 2)

3. What does your chest do when you breathe out?
(In suggested abdominal breathing, chest has little role to play. If your chest is moving when you breathe you are following thoracic breathings which is incorrect breathings pattern for speech)
4. What does your tummy do when you breathe out?
(In abdominal breathing, tummy goes in when you breathe out)
5. How does your chest move when you count numbers?
(Chest move little during counting numbers when you employ abdominal breathing)
6. How does your tummy move when you speak?
(In abdominal breathing tummy gradually bulges out when you speak)
7. What movement do you see when you take a sharp breath in? (This is like a quiet gasp)
(In suggested abdominal breathing, a sharp breath in will result in sudden bulging out of tummy)
8. When you speak, do you speak on the breath in or breathe out?
(We speak on out going breath that is during breath out)
9. When you are breathing at rest which is longer, the breath in or breath out or are they same?
(At rest breath in and breath out are almost of equal duration.)
10. What happens to the length of the breath in and breath out when you speak?
(While speaking breathing out is longer than breathing in)

Exercise 2: Feeling:

1. Place one hand on your lower abdomen *and* the other on the upper chest; watch and feel the breathing patterns at rest as well as during speech.
2. In suggested abdominal breathing only stomach moves. It bulges out when you take air and releases when you leave air. In chest breathing (incorrect breathing pattern for speech) chest moves instead of stomach.
3. Alternate between the two patterns: to see and feel how the movement changes.
4. Once the target pattern is established, repeat the exercises with eyes closed (this is to cut extraneous information and to tune into the sensation).
5. Feel the pressure changes against hands during inspiration and expiration.
6. Feel in the stomach/abdomen of downward pressure on inspiration or a pressure in the upper chest while upper chest expiration.

Exercise 3: Place your both hands either side of the lower abdomen, pretend to blow candles (placed at 3 feet distance) extremely quickly. Feel the abdomen (stomach) "kick in" on the forced blowing (figure 3.2).



Figure 3.2: Illustration of forced blowing.

Exercise 4: With the hands on either side of the lower abdomen (stomach) imagine you are blowing up airbed or swimming arm bands. Feel the strong, smooth contraction of the abdomen as you blow up the imaginary airbed.

Exercise 5: Produce sustained (continuous) "a" and pull the tummy in and out. Notice that the sound is no longer kept steady and that the volume of the sound fluctuates becoming louder and a little higher pitch as the tummy is pulled in then softer and lower in pitch as it is released.

The above exercise can also be practiced with the help of an assistant. An assistant places his/her hand over abdomen (tummy) and push the tummy as you say "ah". *Notice that the "ah" becomes louder and higher in pitch as the tummy is pushed in and softer and lower in pitch as the tummy is released.*

Exercises for sufficient breathing

The following exercises are designed to make sure that your breathing is taking place mostly in the abdomen.

Exercise 6: Sit comfortably, but erect, in a chair. Place your hands so that your thumbs touch the lower ribs at your sides and your fingers are placed over the abdomen. Exhale as much as you can; push in your abdomen with your hands. Next, inhale as much air as you can, keeping your hands in constant pressure against the abdomen. Next, exhale with a slow steady inward and upward movement of the abdomen. Repeat this cycle 20 to 25 times.

Exercise 7: Keep your right hand in the same position as in 6 above, but place your left hand on your upper chest. Repeat the exercise making sure that there is little movement of the upper chest, but full movement of the abdominal. Practice for 10 times. As you are performing this exercise, try to become aware of the sensations, which you feel in the abdomen. Now repeat this exercise without using your hands as a guide for control.

The next set of exercises is intended to improve your control over the expiration phase or air release.

Exercise 8: Take a deep breath, using the lower chest regions predominantly. Whisper 'ah' as long as you can, keeping h steady and constant in force.

- Now do the same thing with a phonated or voiced 'ah'.
- Next, whisper 'ah' in staccato notes as many times as you can in one breath. Such as 'ah' 'ah' 'ah' 'ah'....'ah' (All whispered voice)
- Repeat this with a voiced 'ah'. Such as 'ah' 'ah' 'ah' 'ah'....'ah' (All voiced)
- Count as far as you can easily on a single expiration, using whispered speech. Such as One, Two, Three, Four, Five. . . . (All whispered voice)
- Do the same, using voiced sounds. Such as One, Two, Three, Four, Five. . . . (All voiced)
- Prepare a group of sentence: of approximalely 10-20 words each. Read each of these on a single expiration. While you are reading them, check your expiration with your hands to make sure that yon are not wasting breath either at the beginning of your expiration or at the end.
- Prepare a group of paragraphs that include sentences, which are not too long or complex for easy on:.' reading. Practice reading these paragraphs until you are certain that you have mastered the technique of breathing during "natural" pauses in the meaning of the written material. Natural pauses are short and long break in speech at comma and full-stops respectively.

Exercise 9: When the correct method of breathing is ascertained, begin to prolong the breaths. This means taking less number of breaths but deep breaths instead of many short breaths. Count (silently) 1,2,3,4 on one inhalation and the same on the exhalation. Keep it rhythmical. Gradually extend the time for each respiration until you are taking only three or four breaths to a minute. This exercise can be practical while walking, riding or resting. When walking you can synchronize the counts with your steps. Gradual inhalation for seven seconds and gradual exhalation for seven seconds is appreciable.

Exercise 10: Practice holding the breath. Begin by retaining it only 15 seconds. In 5 second step increase the retention up to 45 seconds. Importantly, air needs to be taken into abdomen not into chest.

Exercise 11: Breathing exercises can be combined profitably with general physical exercises.

Stand erect with the arms hanging at sides. Rise on the toes while raising the arms and touching the hands together above the head. At the same time, and in perfect co-ordination with the physical action, draw in deep breathe. With the beginning of exhalation let the arms fall gently to the sides and the weight settle back on the balls of the feet. Repeat five to six times.

Exercise 12: Draw a full breath with fine gasps through the mouth. With the first three the expansion should be noticed exclusively below the ribs; with the last two the upper chest should be filled to capacity. Exhale in a slow, steady hiss. Reverse the process i.e., inhale in a slow inhalation, and exhale on fine puffs.

- On an easy exhalation, make the simple grunting sounds uh, uh, uh and u-u-h, u-u-h, u-u-h. Vary the sounds with yah, yah, yah. Don't try for volume or force. Just engage in some easy, quiet grunts, seeing how effortlessly the sounds can be made.
- Now, shout to the conductor of a bus 200 to 300 feet from you. First use a whisper. Then use a vocal tone. Don't strain! Get the force from your abdomen muscles, and keep your throat open and relaxed. Notice the difference in the amount of volume achieved. Note that you can repeat the phrase over and over on the same breath, whereas in the whispered shout you probably used all your breath on one phrase.
- Place your hands on your sides, below your ribs, as described earlier. Draw in a breath. Ease now, but not too much. Don't strain. With your throat open like a funnel make the tone a-a-a-h. Hold it as long as you can. Did you feel the muscles of your abdomen contracting? Do you see how those muscles function to supply the stream of controlled breath to support the tone?
- Open the throat and at the same time draw in an adequate supply of breath. Imagine you are drinking fresh air. Now, with the throat still open, exhale on the tone a-a-a-h. Repeat the tone five times till you are exhausted with air on one breath, all on the same mono-pitch.
- Hold a lighted candle three or four inches in front of the lips. Sing up and down the scale, at first softly, then with gradually increased volume. Try to keep the light from being blown out but flickering. If the tones are well produced and the breath stream well controlled, flickering may be done with speech instead of song notes.
- Assume a good standing position, with chest up but not rigid; abdomen flat but not tense; shoulders, neck and jaw relaxed. Inhale deeply through

the open mouth, and gently begin to say the alphabet. When you reach the end of it, begin over again without taking additional breath. Say the alphabets many times as you can on one breath, without permitting your chest to cave in. Be sure that all the alphabets are said loudly, clearly and equally spaced. Also be sure that speaking is accompanied by a gradual controlling and drawing in of the abdomen. At first you may not be able to say the alphabet more than twice on one breath; but if you practice regularly five or ten minutes a day, at the end of a few weeks you should easily say it six or eight times as your diaphragm and abdominal muscles gain strength and control.

Exercise 17: Exercises combining phrasing and breathing

Several factors affect the length of the phrases we use in speaking. One of the important considerations that help to determine the length of the phrases is the speaker's need for breath. In talking we do not normally take a long breath and keep on talking until all the breath is exhausted. Rather, we break up our sentences into phrases, taking little sips of breath between the phrases. For a speaker to use long, continuous sentences, without breaks for breathing, it is extremely exhausting both to him and to his listeners.

Look for a minute, at Lincoln's well-known sentence:

Fourscore and seven years ago, our father brought forth on this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal.

It would be possible, of course, to say this sentence in two phrases, pausing for breath only at the comma in the middle of the sentence. But this would not be

wise, whether for getting full meaning from the sentence or for securing a good, well-supported tone. The speaker doesn't have to follow the phrasing that is indicated by the punctuation of the written page. Instead, he can make his own phrasing. There are a different ways the above sentence can be phrased. Try some of them, and at many of the pauses for phrasing draw in a little sip of breath to keep your supply replenished. Try this way, for example,

*Fourscore and seven years ago/ our father brought forth on this continent/
new nation/ conceived in liberty/ and dedicated to the proposition/ that all
men/ are created equal.*

Try different-length phrases, with quick intakes of breath interspersed, on the following sentence

*At a time when the world needs above all other things the activity of
generous imaginations and the creative leadership of planning and
inventive minds our thinking is shriveled with panic.*

You could pick newspaper read an article slowly pausing at commas and full-stops. Read an article multiple times until you are sure that you could regulate breath according to the needs of the prose.

Exercise 18: Laughing as a diaphragmatic exercise

- Laugh loudly, vigorously, and freely. Repeat several times. It may be necessary to think of something hilariously funny at first, to generate the need of hearty laughter.
- Inhale deeply and expansively as if about to yawn. But instead of yawning emit a loud, laughing exclamation: "HA!" Repeat several times. Employ the spontaneous diaphragmatic action of a loud belly-laugh with each "HA!" Feel the thrust of the diaphragm with each attack, as in a

Ahhhhhhhhhh

Count 10

If symptoms of breathiness or hoarseness persist, the following exercise will be beneficial.

Exercise 21: Building concepts of minimum effort and breath economy.

- Prolong the vowel sound 'ah' at a normal pitch level in a monotone. Gradually diminish the loudness, without pausing or break, until the sound is scarcely audible.
- Sustain this scarcely audible sound, which may be designated the lowest dynamic level of tone production, for at least ten seconds. While doing so cover the ears tightly with the palms of the hands and you will be able to hear a low, regular vibration by bone conduction. The more regularly and slowly the vibrations are felt the better your performance.
- Now prolong 'ah' continuously at the lowest dynamic level while you alternately cover and uncover your ears. The longer the soft, pulling vocal sound is made to last, the more economical the flow of breath and hence the larynx will function more efficiently. Repeat many times.
- Now prolong the soft, pulling sound of 'ah' in a low-pitched monotone, with the ears uncovered. Lightly touch the Adam's apple to feel the vibrations of the larynx externally. Continue this step until you can maintain the tone for at least thirty seconds without a break. The sound should be free from breathiness at this stage. Minimum muscular effort is essential throughout this exercise. Practice daily for several weeks.

Exercise 22: Building concepts of volume, intensity and projection.

- a) Prolong the vowel sound "ah" softly, at the normal pitch level.
- b) Now, gradually increase the loudness of the sound "ah" in a monotone as long as the breath lasts and at the same time listen intently for symptoms of breathiness or strain. If these appear, stop and begin the exercise again.
- c) To make sure that you increase the sounds gradually imagine a person slowly walking away from you. As he recedes "reach" him with your voice, until a distance of about twenty feet is spanned.
- d) Now prolong "ah" at the maximum (twenty-foot) loudness that can be attained without straining. A fielding sensation in the throat, coughing, and resulting hoarseness are all common signs of over strain. Stop the exercise as soon as these symptoms appear and repeat with minimum effort.
- e) Now, start with a twenty-foot volume and gradually decrease the loudness, assuming that the person is now slowly walking toward you. Always direct your voice so that the imaginary person can hear you without straining.
- f) Alternate (b) and (e).

A listener can hear a good resonant voice in ordinary speech at least fifteen feet away in a normally quiet room.

Exercise 23: After the preceding exercise has been thoroughly mastered, start with a twenty-foot volume, the previous maximum, and project a comfortably clear, resonant "ah" sound. Use a monotone on the normal pitch level as before. Now follow (with the voice only) a gradually receding imaginary listener or microphone into space at the rate of one foot per second, increasing the projection by degrees, one foot at a time. Use a monotone, stop when you think the distance

of fifty feet is reached and prolong the fifty-foot tone without breathiness or pitch strain. Repeat the exercise many times, until this projection formula has become familiar.

How will your voice improve with these exercises?

Regular practice of the above exercises would improve respiration, vital support for speech. An adequate respiratory support would yield increased vital capacity and maximum phonation duration, better mean air flow rate and improved speech production in terms of longer, louder, clearer voice that is important part of voice projection.

Chapter IV: Pitch and its exercises

What is pitch?

Pitch is the perceived frequency. It is a psychological aspect of frequency. High frequencies are perceived to be high pitched and low frequencies are perceived to be low pitched. Notice that a whistle sounds high pitched compared to a drum sound. Likewise, a high frequency vibration of vocal cords (as with females) is perceived to be of high pitch and low frequency vibration of vocal cords (as with males) is perceived to be of low pitch. Pitch is also important in the expression of emotions. Different pitch fluctuations depict different emotions. A rising pitch on a sentence makes the sentence interrogative and a falling pitch on a sentence makes the sentence a declarative sentence.

What is normal pitch?

Pitch and frequency are used interchangeably. A normal pitch of a person is the one that is apt for a person according to the gender, age, and culture. An adult male would have a lower pitch compared to an adult female. To some extent cultural background also determines what is called normal pitch.

An adult male would have a normal pitch ranging from 80 Hz to 180 Hz; an adult female would have a normal pitch ranging from 180 Hz to 240 Hz; a child would have a normal pitch ranging from 250 Hz to 400 Hz. An abnormal pitch may be because of structural causes at the larynx (voice box), neurological causes or of psychological reasons.

How does pitch develop?

Pitch of a person varies between high and low during life period. It is high during childhood, decreases with age up to late adulthood and then increases as the age progresses to senility. Development of pitch varies between males and females. Figure 4.1 illustrates development of pitch.

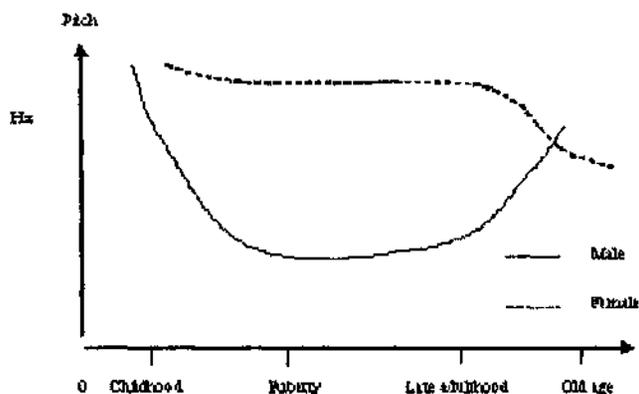


Figure 4.1: Development of pitch.

What is pitch range?

Pitch range of a person is the range of pitches that s/he can produce. In other words it is the difference between the maximum and minimum pitch that a person can achieve. Without adequate pitch variations speech sounds monotonous, flat and fails to keep up the listeners' attention. A good modulated pitch during speaking or reading is helpful in conveying various emotions as well as to maintain the interest of the listener.

What is normal pitch range in speech and reading?

A pitch range of 30 Hz is required to make the speech interesting and not boring.

What is normal pitch range possible for adult males?

A normal healthy adult male would have a pitch range of 1 to 1 1/2 octaves. For example, if the lowest pitch is 100 Hz an octave of that is 100 x 2=200 Hz and 1 1/2 octave is 300 Hz. Likewise if the lowest frequency is 150 Hz, the octave and 1 1/2 octaves of it would be 300 (that is 150 x 2) and 450 Hz, respectively.

What is normal pitch range possible for adult females?

A normal healthy female would have a pitch range of 2 to 2 1/2 octaves. For example, If the lowest frequency is 100 Hz, 1 octave of it is 100 x 2 = 200 Hz; 2 octaves of it is 100x 2 x2=400 Hz and 2 1/2 octave is 625 Hz. Likewise if the lowest frequency is 150 Hz, 2 octaves and 2 1/2 octaves of it would be 600 and 675 Hz, respectively. Figure 4.2 represents the frequency range in octaves.

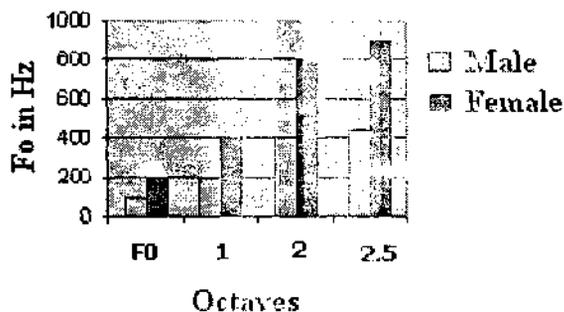


Figure 4.2. Frequency range in males for different fundamental frequency.

What is abnormal pitch range?

An abnormal/narrow/limited pitch range is limited range of pitches. With some although they are able to produce normal pitch range, the increase or decrease in pitch is not smooth. The causes for abnormal pitch range could be any neurological, psychological or organic causes related to vocal system.

Check your pitch and pitch range

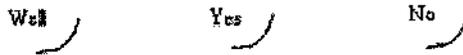
	YOU	REFERENCE
130 Hz for Males Phonation	of	vowel/a/ 180 for Females
Speech		30 Hz
Reading		30 Hz

What are the exercises to improve pitch and pitch range?

The following exercises are geared towards increasing pitch range.

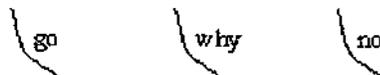
Exercise 1: Use the words *well*, *yes*, *no* Practice rising inflections as shown below.

Well Yes No



Exercise 2: Using the words "go", "why", and "no" practice falling inflections as shown below.

go why no



Exercise 3: On vowel /a/ practice double inflections, a rising pitch that drops off to a falling pitch. This kind of pitch bending in a single syllabic word seems, as you will hear to convey sarcasm, uncertainty or double meaning.

Exercise 4: Now practice changing pitch inflections on entire sentence. Read aloud the sentence below, making the pitch changes that are indicated. The words and syllables level with the dash are at your normal pitch; the others are above or below it.

WE HAVE GONE OVER IT A THOUSAND TIMES
 EVERY BODY WENT DOWN TOWN.
 NEXT WEEK WE'RE DRIVING TO NEW MEXICO
 WE BAKED THREE APPLE PIES AND TWO CHOCOLATE CAKES.
 WHEN I GET OLDER, I'LL DYE MY HAIR BROWN.
 WE WENT TO A PLAY AND THEN TOOK THE SUBWAY TO HER HOUSE.
 HE CAMPAIGNED FOR THE DEMOCRATS AND LOST THE ELECTION.

Exercise 5: Read the following passage four times in four ways: chanting in monotone, with narrow range, with average range, with wide range. Use your "best" pitch level. As you increase your range which the whole distribution above

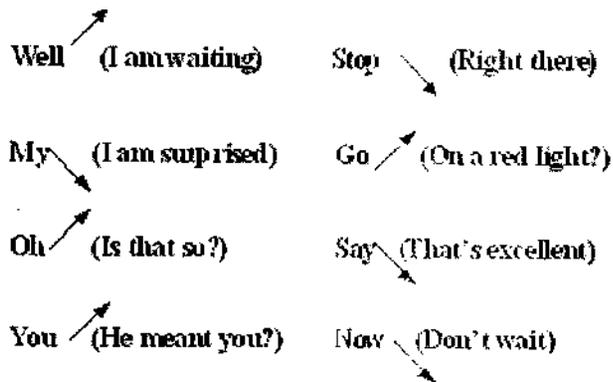
and below your level. Avoid accomplishing the range variations with a few isolated instances of high or low pitch.

In speaking or reading, a good speaker uses pitch variations of about 30 Hz. A poor speaker may limit his range of pitch. An actor, whose technique involves an element of artistic exaggeration, may vary his pitch as much as two octaves that are double of his or her fundamental frequency. It is not desirable in ordinary speech, of course, for a speaker to emulate a dramatic actor, but it is also undesirable for him to be monotonous. Variety of pitch, sensibly related to meaning, adds interest to any type of speech.

Exercise 6: Read the above passage. Begin with a chant at your best level and gradually increase the variability until you end with a very wide range.

- Read a passage again but stop increasing your variability when you consider it to be optimum and finish the passage that way.
- Read the passage again working towards the point of optimum variability but this time start with extremely large variability and decrease to optimum.
- Select a short passage of factual prose. Attempt to read it at your best level, and with optimum range and variability.
- Make the same attempt as you give a brief impromptu speech.

Exercise 7: Speak each of the following words with inflections (modulations of pitch during phonation) as indicated by the arrow and impart it to the meaning suggested.



- Consider the words yes, no, please, what, where, don't, who, when, there, why, good, wait, how, here, so, fine. To each word attach " meaning that would be consistent with downward inflection and another meaning consistent with upward inflection. Write phrases to indicate these meanings. Speak the words accordingly. Exaggerate the inflections.
- Repeat the above step but for each inflection both downward and upward try three different extents of pitch variations: narrow, average, wide.

Exercise 8: Read the following two word sentences. After the first word of each use a short pause and an *upward* shift to the start of the second word. Exaggerate; remember that *shift* refers to the relationship between the *last* pitch before and the *first* pitch after the pause.

Move fast	Winter came	Shut up
Fish swim	Go home	All through
Stay here	Right now	Write this
Full house	Look out	We heard
Make way	They talk	

Repeat the above phrases using *downward* shifts on the second word.

Exercise 9: Read the following two-phrase sentences using upward shift, downward shift or no shift as the arrow indicates.

I couldn't do it, |↑| even for you

He stopped still, |↑| listening intensely

If they lose it, |↓| they'll never find it

Did he run to the right, |↓| or to the left

That's the best one, |→| without a doubt

When he comes home, |→| we'll tell him

Study the following. Read with upward, downward, or no shift at each space, as the meaning seems to indicate. Try various possibilities. Then make appropriate shifts with arrows.

You can't lose, | | take a short

If he doesn't answer, | | write him

The sign said, | | "for sale"

Come to think of it, | | I do know

Do you, | | or don't you?

If you can't do it, | | lean

Phrase it carefully | | as if you meant it

Your honor, | | I am guilty

Exercise 10: Count from one through ten at your optimum pitch level. Now count to ten in a monotone three tones above your optimum pitch. Raise the pitch level

three more tones and repeat the count. Finally count to ten at the very top of your normal pitch range.

Exercise 11: Read the following quotations in a loud voice, first using a controlled rate in a monotone, then a normal rate with the indicated vocal inflections. Exaggerate the indicated rising and falling pitch changes. Avoid a double inflection (rise followed by a fall, or vice versa) in any one syllable. Remember that the vowels in the syllables preceding the inflection must take the pitch changes.

The following inflections are suggested as exercises only. They are not to be considered as models for interpretations. The mark (↑) indicates a sliding rise of vocal pitch, or upward inflection of the voice; the mark (↓) indicates a sliding fall of vocal pitch, or downward inflection of the voice.

Start each whole phrase on a normal pitch level and inflect upwards on each (↑); downwards on each (↓).

1. I am a feather (↑) for each bird that follows.
2. It is the crushed grape (↑) That gives out the blood-red wine (↓); it is the suffering soul (↑) that breathes the sweetest melodies (↓).
3. No man is a hypocrite (↑) in his pleasure (↓).
4. Let not the sun go down (↑) upon your wrath (↓)
5. Collect as pearls (↑) the words of the wise (↑) and virtuous (↓).
6. Assertion (↑) unsupported by fact (↑) is nugatory; (↓) sunrise and general abuse, in however elegant language (↑), ought not to pass for proofs (↓).

7. We gain nothing (↑) by vying with such as ourselves (↓) we encourage one another (↑) in mediocrity (↓). I am always longing to be with men more excellent (↑) than myself.
8. Astronomy is one of the supplement fields (↑) of human investigation (↓); the mind that grasps its facts and principles (↑) receives something of the enlargement and grandeur belonging to the science itself (↓). It is a quickened (↑) of devotion (↓).
9. There are authors (↑) in whose hand the pen becomes a magic wand (↓); but they are few (↓).
10. There is thy gold (↑); worse poison to men's souls (↓).

How will your voice improve with these exercises?

The above exercises improve your pitch range. A wide, flexible pitch range is helpful in making speech emotionally clear and also in sustaining interest of the listeners.

Chapter V: Resonance and *its* exercises

What is resonance?

Let us consider the condition of audience making noise in a cinema theater. As we might have noticed, the noise is loud, reverberated in a closed enclosure like theater than when it would have been made in the open air. The condition can be used to draw parallel to human speech production in understanding resonance. As like in theater where a feeble sound becomes more louder than in open air, the tone produced at the vocal cords is also strengthened (resonated) in the vocal tract. The hollow cavities that lie above the vocal cords act as resonators (chamber that amplifies the sound). Two cavities act as ...resonators in humans. One is oral cavity that lies from behind the teeth till the back of the tongue. The second called nasal cavity lies above the oral cavity; it is the hollow space in the nose extending up to back of the tongue.

How loud is normal voice?

Normal conversational speech usually ranges between 65 dB to 80 dB.

How loud is your voice in shouting?

A loud speech ranges between 80 dB to 110 dB.

What is abnormal loudness?

An abnormal loudness is inappropriate loudness according to the context. Weak voice is the result of poor vocal habits such as poor breath control, habitual breathing, and excessive tension of the vocal mechanism, inappropriate pitch or improper use of the resonating cavities to reinforce vocal tones or due to neurological or organic causes.

Check your loudness

	YOU	REFERENCE
Phonation of vowel/a/		65 dB
Speech		65 dB
Reading		65 dB

What are the exercises that improve your loudness?

Exercise 1: Place your hand on the stomach and say "ah". Then take a deep but comfortable breath and again begin to say "ah". This time apply pressure suddenly with your hands. The tone should increase in loudness when the stomach is pushed in.

- Repeat the above exercise producing three loud "ah" without straining. Breathe in if necessary after each "ah". Remember loud voice production requires more breathe than normal conversation so that more frequent inhalation becomes necessary to maintain a loud voice.
- Repeat the initial exercise except this time exerts direct control over the stomach as you produce your loud "ah".

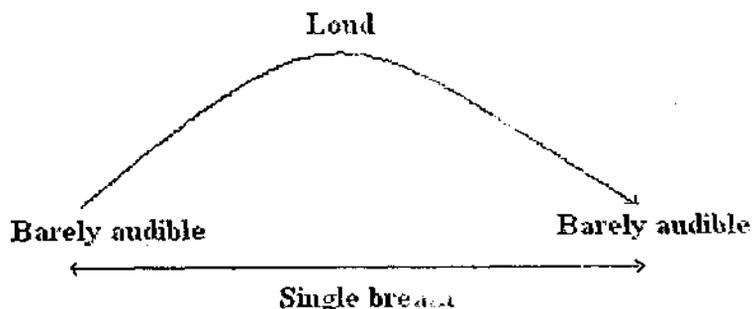
Exercise 2: Say the following short commands loudly each on a single breath, without strain and without an increase in pitch level¹ towards the end of the phrase.

Let's go!	Time out!
You go!	Stop him!
Look lively!	Give him a hand!
Lower away!	Let him go!
Turn around!	Silence please!

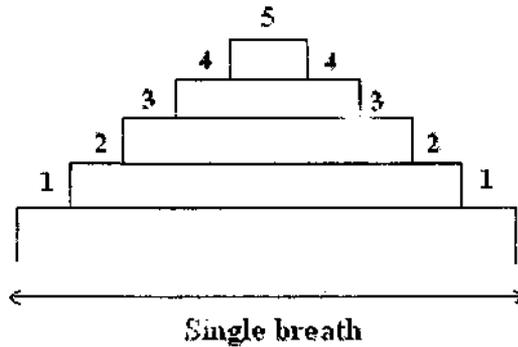
Exercise 3: Try the following sentences on a single breath. Speak as if there is a need to use loud voice to assert you.

This will never do
Let's waste no more time
Certainly. I am what I said
Old fellow; just pack up and go

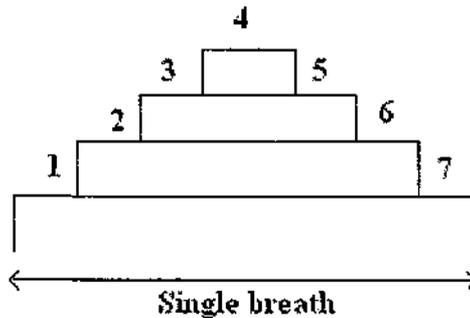
Exercise 4: Initiate an "ah" in a tone which is barely audible, gradually increase the loudness of the "ah" until it is louder than your usually conversational voice and then reduce the loudness until the tone is again barely audible in single breath. Do not change the pitch or force the length of exhalation beyond a point of comfort.



Exercise 5: Count from one to five increasing the loudness on each number. Begin with a barely audible "one" and end with a "five" which can easily be heard across a forty-foot room.



Count till seven increasing the loudness up to four and then decreasing loudness from five through seven. Maintain the same pitch level through out the count.



Exercise 6: Say each of the following phrases or sentences three times increasing loudness from a normal conversational level to one that can easily be heard across a forty-foot room.

I'll go

Comeback

Please

No

I won't

Enough

Exercise 7: Lengthen the vowel *la* each of the following words and maintain uniform loudness throughout the lengthened production of the vowel. Do not, however, distort the vowel by excessive lengthening.

Alms	Gnaw	Bomb	Thaw	Father
Walk •	Pause	Tall	Awe	Mall

Exercise 8: Lengthen and maintain the force for the vowels or diphthongs of the stressed syllables in the following phrases. Again, avoid distorting the vowel or diphthong to a point where a listener would not be certain of the words you are saying.

Loud laughter	Hearty pleasure
Come on time	Honest and true
Almost always	Large house
Bounce the ball	Ancient author
Worthy cause	Gone yonder

Exercise 9: Read each of the following sentences, first in an ordinary conversational tone and then if you were trying to address a person in the tenth row of a crowded room.

Is that you Sheela?
I'll go in a few minutes
The time is now
I'll say this for the last time
Listen if you want to understand
Are you Mahesh?

Exercise 10: Drop your jaw, for a gentle but open-mouthed yawn. Inhale with your mouth open, and then pull in slowly but firmly on the abdominal muscles. Now permit a yawn to escape as you exhale as a 'by-product' of the position of mouth and the controlled breathing.

Exercise 11: Repeat exercise 10 five times, making the yawn louder each time but maintaining the same pitch.

Exercise 12: Now, instead of yawning, prepare to say 'aw' as in 'awful'. Maintain an even pitch. Repeat five times.

Say 'oh' as follows:

- (a) as if surprised
- (b) as if horrified
- (c) as if pleased and
- (d) as if you are shouting or warning

Exercise 13: Pretend you are imitating a siren on a fire truck, increasing and decreasing the loudness of your voice on the sound 'oh'. Repeat using the sound 'aw'. Avoid any feeling of tension of the throat or larynx, and do not extend the length of vocalization to point of discomfort.

Exercise 14: Imagine yourself a drill sergeant and give your platoon the following orders. Remember, your voice should resemble a sergeant's voice having adequate loudness and authority in voice.

Forward, march	Platoon, halt
About, turn	At, ease
To the rear, March	Fall, Out

Exercise 15: Read the following as if you were addressing four hundred persons waiting for your announcements in an auditorium that has no public address system.

The meeting is adjourned. Return in two hours.

Tomorrow! Meeting will begin at 9.00 A.M.

Refreshments will be served in the recreation hall.

John Smith is the winner.

There will be no school tomorrow.

Please leave by the nearest exit.

Exercise 16: Check your articulation. Are you a mumblor? Some people habitually fail to articulate sounds such as "t, d, sb ch, k, g, f and v". Articulation and loudness usually go hand in hand. If you do not articulate clearly, no amount of volume will help you be understood. On the other hand, well-articulated speech at too low volume is still indistinct speech. Listen to a receding of your own speech. Do you make the sounds listed above as clearly as they can be made?

Exercise 17: One way to be sure you have enough air for an adequate loudness level is to cut down on the total number of words you say on one breath. Use a tape recorder to check the number of words you customarily say on a breath. If lack of air causes your voice to become softer, cut the number of words from say 15 words to 10 words on each breath. In other words, pause more often. Use your tape recorder and experiment until you find the number of words between pauses that consistently gives you adequate volume for your speech.

Exercise 18: Select a reading material such as newspaper article, practice reading aloud, combining what we have just discussed about pausing more often.

Exercise 19: There is also a lifting technique that you can practice to produce a louder voice. Once you experience producing this louder voice, you will no longer need to use the lifting exercise. Here is how it works.

Sit in chair with your arms extended below the seat on each side. Count aloud from 1 to 10. As you count, reach under the seat and try to lift the chair off the floor. You won't be able to get the chair off the floor of course, but the muscular tension used should increase your breath force, tighten your vocal cords, and result in a louder voice. Repeat the counting and lifting action while tape recording the exercise. On playback, can you hear a louder voice while trying to lift.

Exercise 20: Open your mouth a bit more when you speak. Many people who mumble or speak too softly do so because they do not open their mouths enough when they speak. This may be a problem of yours.

Look at yourself in a mirror when you speak. Do you open your mouth, or do you speak through clenched teeth and almost closed lips?

Try opening your mouth more when you speak.

Allow your lips to shape the words and syllables. You would be unable to speak distinctly if someone put his hand over your mouth when you tried to talk. Keeping your mouth closed is like putting your hand over your mouth.

Exercise 21: This step will require someone else to help you. You will also need to wear ear phones connected to some kind of music source such as your cassette player, a radio or a stereo.

Put on your headset and listen to some music at a low level of volume. Instruct the other person to change the volume of the music higher or lower while you read aloud into a tape recorder. After reading aloud for two to three minutes, listen to the tape. You will be amazed at how loud and clear your voice can sound when you speak with loud music in your ears.

Once you have taped your louder voice, you can use it as a model for practice, just as you did with the lifting exercise. Your memory of your louder voice will be good enough so that you usually will be able to match it without needing the loud noise or music in the background.

Resonance exercises

Exercise 1: Keep the lips together with tight contact and then try to produce a full yawn or even an attempted or half yawn.

Exercise 2: Try to imagine chewing gum or toffee, which increase in size with very chewing movement. As you do this you will be aware of the increased size and openness of the pharynx.

Exercise 3: Try and stick your tongue as out as possible and then try to speak as clearly as possible with your tongue sticking out of your mouth.

Exercise 4: Try and create tension deliberately in the jaw, tongue and pharynx and speak a sentence in this very tight way. It is useful to contrast the sound and

sensation you have when speaking in this manner with the sound and sensation you have when the sentence is spoken without tension.

Exercise 5: Try to say the sentence "Eve ate apples all afternoon" with excessively loose cheek muscles. Try the same with a tight pulled back tongue, now try it with a forward floppy tongue and finally try the same.

Chapter VI: Voice quality and its exercises

It is obvious that, although variety of quality is desirable, there will be one basic quality which distinguishes the voice of the individual and which s/he will use most. The best habitual quality, which each of us should strive to achieve, is one we call normal.

The most common faulty deviations from normal quality are as follows:

- 1) Excessive nasality
- 2) Breathiness
- 3) Harshness

Nasality reduction exercises

Excessive nasality is observed when nasal cavity participates in resonance for oral sounds. The following exercise is helpful in reducing unwanted nasality on oral sounds.

While observing your mouth in a mirror, yawn as vigorously as you can. You will note that the velum comes into contact with the back wall of the throat at the opening into the nasal cavities. Now sustain the sound 'ah' while watching your velum in the mirror. Make sure that the velum remains in contact with the pharyngeal wall during the entire time you are making the vowel sound. While you are producing this sound, alternately hold your nose and release it. If the velum is functioning properly, there should be no noticeable difference in the quality of the sound you are making. Next, prolong the same sound and alternately lower and lift the velum. Notice the change in quality. Come back to

these exercises frequently during your voice training until you have achieved considerable voluntary control over the velum.

Exercise to reduce breathiness

Breathy quality arises from a failure to bring the vocal folds together completely. The following exercises may be helpful in reducing breathiness in voice.

Exercise 1: Prepare and read several sentences which include a number of words beginning with the 'h' sound and with plosives (p, b, t, d) and fricative sounds (f, v, s, z, th) while breathing out gradually and steadily, read these sentences, checking yourself to make sure that you are not permitting a large fraction of your breath to escape before you begin the first word. Try to equalize the amount of breath that you use for all parts of the sentence.

Exercise 2: Read the following word pairs. The second word in each pair should be completely without breathiness, while the first word requires an aspirate attack, which should be stopped as soon as possible as you get into the vowel sound.

Hit	It	Ham	Am	Heat	Eat
Had	Add	Hold	Old	Hair	Air
Hat	At	Hail	Ail	High	Eye
Hand	And	Harm	Arm		

Read these word pairs until you can make the second word of each pair completely free of breathiness.

Exercise to reduce harshness

Harsh voice is observed when the periodicity is lost in vocal cord vibration. Harsh quality is noisy, raspy.

The best way to get rid of a harsh voice quality is by placing the voice forward in the mouth. Many speakers, in situations that demand more than ordinary vocal force, fall into the habit of constricting their throat muscles, instead of pumping more vigorously with their abdominal muscles, and these lapses into their unpleasant harsh quality.

Exercise 1: Use relaxation exercises frequently. Immediately following a period of relaxation, inhale easily, letting your jaw drop relaxed. Start a yawn. As you start the exhalation for the yawn, easily and smoothly say **'hah'**. Keep your throat as open as possible. Follow this exercise with one that includes the entire vowel sounds, prefacing each with the aspirated 'h', 'hah', 'hay', 'hi', 'hii " •' and 'hoo'.

Exercise 2: Use the word pairs in exercise 2 of breathiness section. Read the pairs, keeping in mind that a word beginning with 'h' is favorable for a gradual initiation of the vowel sound that follows. Try to carry over the gradual vowel initiation in the first word to the vowel of the second word. Avoid any abrupt glottal "attacks", that is, clicks or cough-like explosions, before any of the vowels.

Hoarseness: Hoarseness is the combination of breathiness and harshness. The exercises that reduce both breathiness and harshness would eventually reduce hoarseness.

However, it is always important to know the causes of abnormal voice quality and take treatment (medical or voice therapy).

Chapter VII: Voice projection and its exercises

What is voice projection?

Projected voice is viewed as one that has reinforced high overtones and good breath control. When a voice contains greatly reinforced series of high pitched overtones, it is said to be brilliant or projected and is analogous to a bright light. In a bright voice the high pitched frequencies are paramount. Because high frequencies have more impact on our ears than low, they excite our emotions. Low frequencies in the voice lull us unless they are quite intense. Both the pharynx and oral cavity lend support to the weak high overtones of the fundamental pitch. Second, the frontal vowels resonate at very high frequencies, and the clearer or purer the vowel, the sharper the impact of these high formants.

The process of qualifying and projecting vocal sound is just as important to the speaker as the process of phonation. Without adequate amplification the speaking voice would be too feeble to be heard at any distance, resembling the voice of a very tired person.

Voice projection exercises

Yawn as a voice projection exercise

- Yawn freely and deeply, emitting a spontaneous deep vocal sigh. Do not retain either breath or voice during the yawn and, if necessary, gradually stretch the arms sideways and open the mouth fully in characteristic yawning fashion, so as to reproduce the genuine, natural, deep yawning action as closely as possible. Repeat several times.

- Yawn as carelessly and as materially as possible. Now concentrate upon the spontaneous vocal sound 'ah,' that is emitted with each yawn. Try to reproduce this nondescript vocal sound without yawning. Repeat several times.
- Produce the vigorous vocal sound of 'ah' without yawning, as in the preceding exercise, but try to employ the expansive sensation that accompanies the action of yawning. Repeat several times, but with each repetition add more volume and abdominal thrust to the tone. The sound emitted will resemble a deep groan, spontaneously released and forcibly projected. Do not restrain the tone, since the purpose of the exercise is to employ the spontaneous abdominal and diaphragmatic action of the yawn for the production of short, loud vocal sounds.
- After attaining the expansive tune of 'a¹' 'oudly, as in the preceding step, prolong the sound emitted as long as possible, on a normal pitch level, but without diminishing its initial volume. On each tone employ the deep breathing and abdominal action of the yawn, with accompanying expansiveness of chest. A deep hollow vocal sound will result. Prolong this hollow vocal sound until the breath is exhausted. Repeat several times, but check your sensation with each trial.

Chapter VIII: Rate of speech and its exercises

Rate of speech refers to the speed with which one speaks. The normal rate of speech is 5-8 syllables per second or 80-180 words per minute. However, a rate up to 280 words per minute is accepted as normal provided the speech is intelligible.

The following exercises are geared towards establishing adequate rate of speech.

Establishing consistent rate control

Exercise 1: Select a piece of printed prose matter and divide each line of words into syllables by means of short vertical pencil strokes, and then read these as separate units as follows:

The / boy/ went / hun / ting

(Notice the word hunting is divided as it is pronounced)

Exercise 2: Read the entire prose section aloud in a controlled rate, allowing three beats (three seconds) for each vowel sound. Each consonant may be joined to its succeeding syllabic vowel sound.

The following prose selection is a model for preparing reading material for this rate-control exercise:

“All/ true/ speech/ ex/press/es/ thought/ The/ exact/ re/la/tion/ship/ be/tween/ thought/ and/ speech/ has/ never/ been/ pre/cis/ly/ de/fin/d./ The/ dif/fi/cul/ty/ be/ing/ to/ con/ceive/ of/ thought/ in/ o/ther/ terms/ than/ that/ of/ lan/guage./ It/ is/ un/ne/cess/ar/y/ to/ dis/cuss/ this/ re/la/tion/ship/ here./ It/ is/ su/ffi/cient/ for/ us/ to/ re/a/ct/ that/ there/ is/ a/ differ/ence/ be/tween/ speak/ing/ and/ think/ing./ al/though/ the/ two/ are/ close/ly/ re/lat/ed.”

Now, identify and underline the vowels in the following passage and allow three beats for each vowel.

The process of thought may not be dependant upon the use of words, but its adequate expansion is. This verbal expression is both a conscious and a behaviouristic phenomenon. In consequence it comprises the arousal of these images of sound, light, movement etc., which stand as the symbols of the various stages of the thought process. In behaviour it comprises the translation of those images into action - usually though not always, the action called speech or writing which conveys an impression of the thought conclusions to another person.

Exercise 3: Practice reading the prepared selection according to the above instructions every day for a week. One reading should consume approximately

twenty minutes at first, if the rate is slow enough. Repeat the exercise until the ear has become fully conscious of each vocal or vowel sound contained within each syllable, and until each sound is smoothly articulate, stress word endings, especially s's, z's, t's, d's, r's, ng's, th's and l's. Read for precision, not for thought content. Do not pause between words and link all sounds together in a continuous, drawling sequence. Some students will find it necessary to beat out the time or to use a metronome (an instrument that produces beats at set rate) in order to avoid acceleration and to assure evenness of production. The final effect will resemble slow-motion-picture sound patterns of articulated speech.

Exercise 4: After the preceding exercise has been perfected, read the same passage aloud, allowing only two beats for each syllabic vowel sound. Join all the words together as before. The sentence "slow speech helps us hear sounds we speak" would now be read aloud as follows:

Slo-o Spe-e-ch he-e-lps. U-u-s he-e-r sa-a-u-u-ndz we-e spe-e-k.

Exercise 5: Now read aloud the same passage, allowing only one slow beat for each syllabic vowel sound. Try to maintain this speed in succeeding exercises.

Exercise 8: Improvisation in syllabic rate control

If you have followed directions and perfected each successive step then you are prepared to improvise rate of speech. To improvise is to speak in slow, controlled rate on any subject that comes to your mind in the manner described in the preceding exercise.

Illustration

*l-a-s-t n-a-i-t a-i s-aw Th-e s-e-cr-e-ts o-f s-co-tt-a-ntd y-a-r-d: A-I l-a-ilat
th-e pi-kti-u-r be-kaw-z I-t po-r-tr-e-idd r-o-m-a-n-ti-c a-n-d i m-po-s-I-bul
c-a-r-a-cte-r-z a-n-d e-pi-s-o-dz*

While improvising, it is necessary to allow one show beat to each vowel sound and to make the transitions from vowel to vowel or from syllable to syllable in a smooth and fluent manner. The ultimate objective is to achieve a conversational fluency which is understood by listeners without much difficulty

The folio wing criteria may be used when improvising, as a basis for self-guidance and criticism during the students home practice periods:

- 1) Use a rate of 60 to 100 syllables a minute (Remember that the syllable, not the word, is now the unit of pronunciation).
- 2) Prolong the vowel sound in each syllable.
- 3) Practice with a vocal volume that can be heard ,at least twenty feet away.
- 4) Use normal conversational inflections when improvising (Avoid a monotone or a singsong).
- 5) Do not accelerate; that is, keep the rate uniform throughout.
- 6) If necessary, isolate each faulty sound by separating it from its adjacent sounds (This will require a slight pause before and after each defective sound while you mentally prepare the articulating mechanism for the exact adjustments required).
- 7) Join all syllables together without pausing between them, except to renew the breath.
- 8) If necessary, use a mirror during each difficult lingual adjustment.

- 9) Breathe slowly and evenly. Avoid gasping and noisy breathing movements.
- 10) Maintain good posture while practicing, i.e. body relaxed, chest high, head upright, but not tight back.
- 11) Practice with economy of effort i.e. avoid exaggerated muscular movements, tight jaw, contractions of facial muscles etc.
- 12) Carefully listen to the sonority of your speaking voice as it is conveyed in each vowel sound.
- 13) For the time being, let your thoughts be concentrated on precision and accuracy of articulation. Subject matter is not important at this stage.

Chapter IX: Articulation and its exercises

Articulation refers to the pronunciation of sounds. Active articulators are the moving parts within the mouth and include lips, tongue, and velum

The following exercises are geared towards increasing the functioning of the lips.

Exercise 1: Lips need to be exercised in order to keep the muscles capable of making firm explosive sounds as for /p/ and /b/ as in pen, book respectively. Firstly, purse the lips forward and then spread them suddenly into a broad smile.

Exercise 2: Curl the upper lip up towards the nose. Curl the lower lip down towards the chin. Purse the lips and then open and close the pursed lips in an action that resembles the mouth of a gold fish.

Exercise 3: Blow up the cheeks and then "sing your fingers **'pop'** the cheeks producing a sound as the air explodes the lips.

Exercise 4: Produce an exploding, loud / b/ sound as in the word "book", using the lips. Increase this to three /b/s followed by a vowel e.g., /b/ /b/ /bah/. Do the same with /p/ sound as in the word "pen". Increase this to three /p/s followed by a vowel e.g., /p/ /p/ /pah/.

Next, follow this with vowels that end on a /b/ for example /oob/ and /ohb/ and with /p/ for example /oop/ and /ohp/.

Exercise 5: Inflexible lips directly affect phonemic production. Try series of lip "play" exercises for several minutes.

Exercise 5.1: Permit your lips to rest flaccid. Then, as a horse does, blow air out the lips creating a lax buzzing sound. Repeat.

Exercise 5.2: Purse your lips as if kissing. Hold tightly while vocalizing [u] as in 'coo'. Relax, then purse again. Alternate with a teeth-baring smile. Vocalize [i] as in 'key'. Repeat several times.

Exercise 5.3: Pout your lips. Relax. Do this exercise eight times.

Exercise 5.4: Practice the following words, exaggerating the p, b, and m: pop, pip, pipe, pope, pomp, pump, bib, imbibe, bubble, bauble, babble, bumble, numble, murmur, mumbling.

Exercise 5.5: Spread your lips for the sound of the vowel in eat. Round them for the vowel sound in ooze. Repeat eight times.

Exercise 5.6: Drill with continually repeated bilabial (two lips) consonants,

b, b.

p, p.

Add vowel sounds,

be be be be be be be be be be

po po po po po po po po po po

bu bu bu bu bu bu bu bu bu bu

pa pa pa pa pa pa pa pa pa pa

Exercise 5.7: Use the following sound combinations for repeated lip drill. Use exaggerated lip movement to work facial muscles. Saying first the sounds, then the words, perform each at least three times..

<i>Vowels</i>	<i>Sample words</i>
[i] - [æ]	eat - at
[i] - [u]	eat - ooze
[ei] - [a]	ate - on
[ei] - [u]	ate - ooze
[æ] - [u]	at - ooze
[u] - [i]	ooze - eat
[u] - [a]	ooze - on
[u] - [as]	ooze- at

Consonants / Vowels	Sample words
[mi] - [bi]	me - be
[mi] - [bei]	me - bay
[mas] - [bae]	mat - bat
[mE] - [bE]	mall - ball
[mou] - [bou]	moat - boat
[mu] - [bu]	moot - boot

Exercise 5.8: The following exercises improve the production of sounds (m, w, wh, p, b, f,)

- Compress the lips. Now puff out the cheeks with breath and gradually increase the air pressure without allowing air to escape. Suddenly allow the accumulated breath to burst out the resistance of the lips. Relax.
- Repeat the above exercise but prolong the escape of breath through the compressed lips. A prolonged flapping of the lips will result. Repeat often.
- Open the jaws wide. Draw the upper lip fully over the upper teeth and the lower lip fully over the lower teeth. Slowly close and open jaws. Repeat often.
- Pucker the lips as much as possible. Now move them slowly to the extreme left, then to the extreme right. Relax.
- Pucker the lips as much as possible. Move them slowly and not jerking; but evenly and smoothly, in a circle. Relax. Repeat often.
- Compress the lips. Smile as broadly as possible without separating the lips. Now pucker the lips. Relax. Repeat often.
- (i) Bite the lower lip on the outer skin. Smile slowly and broadly with the upper lip, baring as many upper teeth as possible. Relax.
- (ii) Repeat (i), biting upper lip and basing the lower teeth. Alternate steps (i) and (ii). Repeat often.

Exercise 6: Tongue: Clear articulation is characterized by proper tongue positioning, which often requires rapid movement. When you were a child, no doubt you played with sound by wagging and thrusting your tongue. Try the following to achieve the same flexibility you had when you were a child.

Exercise 6.1: Open your mouth: hold your jaw down firmly. Be sure that your tongue, rather than your jaw or lips does the work. Use a mirror to be sure.

Exercise 6.2: Raise the tip of your tongue to the ridge of your upper front teeth. Move it slowly backward along the hard palate. Then advance the tongue over the palate until it reaches the teeth ridge again. Repeat forward and backward movement eight times. Relax. Be sure that your tongue does not leave your palate during this exercise and that your jaw and larynx remain still.

Exercise 6.3: Groove your tongue: advance it slowly as far out of your mouth as possible. Draw it back into your mouth. Repeat eight times. Relax (If you cannot groove your tongue, use a tongue depressor or a stick of hard candy. Try to curl your tongue around the depressor or candy).

Exercise 6.4: Rotate your tongue around your lips, beginning at the right side. Repeat four times. Relax, beginning at the left side. Repeat four times. Relax.

Exercise 6.5: Extend your tongue as far as possible between your teeth. Open your mouth widely and begin to flap your tongue up and down. Increase speed. Add in vocalization /a/.

Exercise 6.6: Extend your tongue again. This time wag it rapidly from side to side. Alternate this movement with up and down flapping. Add in vocalization.

Exercise 6.7: The following sound sequences represent alternate tongue movement from front to back mouth positions. Begin slowly, then increase rapidity of movement. You should strive for clarity over rapidity.

Sound	Sample words
[θ] - [k]	thin - kin
[θ] - [gk]	then - give
[t] - [k]	to - kin
[d]-[g]	dog-give
[n] - [n]	no - ring

Add in vowel sounds.

Vowel Sounds	Sample words
[i] - [ki]	eat - keep
[ou] - [gou]	oat - goat
[tu] - [ku]	too - coop
[d] - [d]	daw - gaw
[ni] - [in]	knee - sing

Exercise 6.8: Slowly move the tip of the tongue around the oral cavity in every direction. Touch every part (upper and lower teeth, right and left cheeks, hard palate and surface, part of the soft palate and inside the lips) that can be reached, without undue muscular strain. Repeat often.

Exercise 6.9: Open the jaws wide. Extend the tongue outside the oral cavity between the upper lip and teeth. Slowly brush the tip of the tongue over the surface of the upper and lower teeth. Repeat often.

Exercise 6.10: Without separating the lips, open the jaws. Now press the tongue against the inside of the upper lip. Move the tongue slowly in a semicircle, exerting pressure against the lips. Repeat often.

Exercise 6.11: Open the mouth wide. Elevate the tongue so that the upper surface of the tip touches the hard palate. Without moving the lower jaw, gradually increase the pressure of the tongue against the hard palate. Then relax. Repeat often.

Exercise 6.12: Open the mouth. Press the under side of the tip of the tongue against the hard palate. Gradually increase the pressure of the tongue without moving the lower jaw and without permitting the tongue tip to move from the position on the hard palate. Relax. Repeat often.

Exercise 6.13: Open the mouth wide. Curl the tongue until the tip touches the front portion of the soft palate. Gradually increase the pressure of the tongue. Return the tongue to rest position. Repeat often.

Practice the above drills daily as warming up exercises.

*Exercise 7: **Softpalate exercises:** The soft palate or velum is a muscle which joins the bony structure of the roof of the mouth or hard palate, and forms a continuous surface with the latter, with the pillars of the oral cavity, and the base of the tongue. Excessive nasality may result from an inactive velum. Using a mirror, try the following exercises.*

Exercise 7.1: Say /a/. Observe the velum rising upward and backward. Now, produce the same movement without /a/. Perform several of these movements.

Exercise 7.2: Produce the following sounds in rapid succession to aid you in feeling the action of the velum: p m p m p m p m

Exercise 7.3: Raise the tip of your tongue to your upper gum ridge. Say 'n'. Drop the tip of your tongue and raise the back of your tongue to your soft palate. Say the final sound in sing. Practice these two consonants to the count of eight. Relax, Repeat, and Relax.

Exercise 7.4: Open your mouth; look in a mirror and observe the action of your uvula when you breathe in. Pant, Relax, Pant, and Relax.

Exercise 7.5: Yawn or simulate a yawn. Analyze what happens to your soft palate.

Exercise 7.6: Pinching your nostrils together, read aloud the following sentences. If you sound 'stuffy' your velum was not raised. Try the sentences until all sounds are clear.

1. You should get relief if you talk to your doctor.
2. Political advisors are worried about widespread views which are opposite to theirs.
3. Check it out for yourself before you purchase
4. The eclipse showed us that our orbit is very big.
5. I ask that you be taught the proper way to better your voice.

Exercise 7.7: Try the following nasal and oral sounds in combination making sure only [m], [n], and [ŋ] are produced through the nose. Work slowly, separating sounds clearly to identify the place of production. Touch your nose to feel vibration on the following words:

men	man	running	ringing
sing	king	nonsense	sounding

nosing thinking

Exercise 7.8: One of the best drills for exercising the soft palate is the yawn. Yawn as often as possible, each time mentally studying the round symmetrical expansion of the interior portion of the mouth cavity, especially in the region of the back tongue, pharynx and soft palate. In due time it should be possible to stretch the yawning muscles without resorting to an actual yawn.

Exercise 7.9: Hold the lips tightly closed and fill the mouth and cheeks with as much forced breath as can be held, without allowing any of it to escape. Now suddenly, and without opening the lips, release all the breath through nose with a snort. This exercise should be practiced with very little breath pressure at first. Concentrate upon the valve like action of the soft palate muscle during the nasal breath release. Rest five to ten seconds between trials. Repeat often.

Exercise 7.10: Slowly initiate the act of swallowing. Just before the final release of the swallowing muscles, suddenly inhale through the nose. Repeat several times. The physiological action of swallowing is used here merely as a device for awakening the sensation of palatal movement and its accompanying upward tongue pressure. As soon as these sensations are recognized, palatal action may be practiced without the swallowing activity.

Exercise 7.11: Practice a series of short, explosive, whispered 'k' sounds without lowering the tongue arch. Try to capture the sensation of upward palatal movement during this exercise.

Exercise 7.12: Repeat the instructions in the preceding exercise, this time emitting the explosive voiced sound of 'g' (as in go) without lowering any portion of the tongue. Glance into the mirror and notice the quick, upward jerk of the

palate muscle which accompanies the sound of 'g'. This palatal movement is called the velar-catch. It occurs only when the sound g is pronounced.

Exercise 7.13: While exerting upward pressure of the back tongue arch against the soft palate, the breath should be exhaled explosively in a succession of short nasal snorting puffs. Make certain that the breath is emitted through the nose and that the back tongue arch always retains its firm content and upward pressure against the soft palate.

Exercise 7.14: This time add voice to the explosive nasal emission of breath as practiced in the preceding exercise. This vocal sound should be short, tense, staccato and nasal. Try to feel the continuous upward pressure of the tongue arch against the palate during this exercise. Concentrate upon the sensation of palatal movement at the moment of sound utterance.

Exercise 7.15: Alternate the two sounds ng + g and ng + k successively, with exaggerated muscular tension of the parts involved, until it has been clearly ascertained that a lowering of the back-tongue-arch is not necessary during the emission of either stopped 'g' or stopped 'k'. Keep the attention focused upon the slight upward velar catch which occurs whenever 'k' or 'g' is sounded.

Exercise 7.16: Produce the sound of a prolonged nasal 'ng' (as in young) with exaggerated tongue and palatal pressure, followed by the prolonged vowel sound of 'ah' as in 'art'. Repeat often.

The transition between nasal 'ng' (as in young) and oral 'd' should be made gradually (to ten slow counts) with a relaxed soft palate. While lowering the back-tongue-arch be careful to avoid the upward velar catch.

An awareness of the two actions (i.e. the velar-catch or sudden upward movement of the soft palate for stopped 'k' and g, and the depression of the back-tongue-arch with a stationary soft palate for all ng vowel combinations) should have been established by this time, through the sensation of touch, sight and hearing. These sensations should be thoroughly memorized and the practice of the drills continued until voluntary control over soft palate is achieved.

Exercise 8: *The following exercises are geared towards increasing the functioning of the tongue. The tongue needs to be exercised so that it is capable of flexible movements without tension which is important in production of many sounds, such as /k/ /t/ /d/ /n/ to name a few.*

Exercise 8.1: Stretch the tongue as far out of the mouth as you can and then allow it to relax back into the mouth, leaving the tip touching the lower front teeth. Do it 10 times.

Exercise 8.2: The following exercises aims to stretch the middle of the tongue. Place the tip behind the lower front teeth and then pull the middle of the tongue forward and out of the mouth. Hold the stretched position for a few seconds (at least 5 seconds) and then release. Repeat 5 times.

Exercise 8.3: Lift the tongue to the ridge behind the upper teeth and explode the consonant sequence /d/ /d/ /dl /d/ and /t/ /t/ /t/ /t/. Say each /d/ and /t/ 10 times. Lift the tongue as if you are saying /l/, then precede the /l/ by a series of vowels for example, /eel/ /ool/ /ahl/ /ohl/. Use a series of words containing /l/ to exercise the tongue upward movements; these can be done with children asking them to supply the words for example, *lorry, loud, light, cool, feel, hold, golden, lazy.*

Exercise 9:

Tension is often centered in the neck area during speech production. Tension can inhibit good speech sound production as can be seen in figure 9.1.



Figure 9.1: Tension in the neck region.

The following exercises are designed to help achieve flexibility in the neck and lower jaw.

Exercise 9.1: Sit or stand erectly. Using a full 60 seconds, permit your head to fall forward, roll to the left, to the right, and forward again. As you do so, feel the stretching of neck muscles. Do not force a stretch but let the weight of your head pull the muscle. Reverse the direction of the head roll. Spend about 5 minutes releasing the muscles, and then raise your head to an upright position.

Exercise 9.2: Place four fingers on your chin and pull your jaw down. Imagine that the weight of your fingers is pulling your jaw downward. Your impulse will be to resist the pull. Resist this impulse and let your jaw drop until you feel it

open to capacity. Take about thirty to 45 seconds. You should achieve the degree of openness that would enable you to insert two fingers vertically between your teeth. Try this sequence several times until you are easily able to achieve a relaxed jaw. The exercise is helpful in increasing lower jaw strength.

Exercise 9.3: Each vowel requires the jaw to be opened to certain extent. By alternating individual vowels, you can exercise your lower jaw. Exaggerate the jaw movements required to produce the following combinations and repeat each at least three times.

Sounds	Sample words
[i]- [æ]	eat-ask
[i] - [ou]	eat - oat
[i] - [u]	eat - ooze
[ei] - [æ]	ate - ask
[el] - [ou]	ate - oat
[el] - [u]	ate - ooze
[æ] - [i]	ask - eat
[23] - [ou]	ask -oat
[æ] - [u]	ask - ooze
[>]-[I]	off-eat
[]]-[æ]	off-ask
[ou] - [33]	oat - ask
[ou] - [ei]	oat - ate
[ou] - [i]	oat - ate
[u] - [as]	ooze - ask
[u] - [ei]	ooze - ate
[u] - [i]	ooze - eat

Exercise 10: The following sentences incorporate common phrases that are often slurred. Work with these repeatedly to improve your articulation. Start slowly, then repeat as you increase rate of delivery. Practice the following sentences in slurred and correct articulation.

- 1) Aren't you coming to the game?
- 2) Do you believe them when they say they'll do it?
- 3) Do you want me to stay here or go away?
- 4) Get it off of here
- 5) Give it to them
- 6) Give me a little time
- 7) Go on outside and play
- 8) He must have gone away
- 9) He is one of the best
- 10) How about you?
- 11) How are you doing today?
- 12) It is good as far as I can tell
- 13) I just don't know about that
- 14) I don't know what to say
- 15) I had to do it
- 16) T am going away next week
- 17) It's been so long since I last saw you
- 18) It's half past six-o'clock in the evening
- 19) It's not so hot today as it was yesterday
- 20) I wish I could go there
- 21) It wouldn't have happened, not if I'd have had it
- 22) Let me see if I can do it

- 23) Let's go over the agenda once again
- 24) Now more than ever, we should pay attention
- 25) One of them played for the other team
- 26) See if you can make it to the party Sunday
- 27) That's just the way it goes sometimes
- 28) They can go anywhere they want to go
- 29) They could have believed him when he said he would do it.
- 30) Think about this one and then think about that one
- 31) See if anyone is coming
- 32) What do you think you are doing
- 33) What did he say about that?
- 34) What did you do that for ?
- 35) What did I tell you?
- 36) What did you mean when you said we should go with you?
- 37) What do you know about all of those things?
- 38) Where have you been all this time?
- 39) Why didn't you go with them?
- 40) You should find your own?

Short listed exercises for daily practice

Exercise 1: Sit comfortably, but erect, in a chair. Place your hands so that your thumbs touch the lower ribs at your sides and your fingers are placed over the abdomen. Exhale as much as you can; push in your abdomen with your hands. Next, inhale as much air as you can, keeping your hands in constant pressure against the abdomen. Next, exhale with a slow steady inward and upward movement of the abdomen. Repeat this cycle 20 to 25 times.

Exercise 2: When the correct method of breathing is ascertained, begin to prolong the breaths. This means taking less number of breaths but deep breaths instead of many short breaths. Count (silently) 1,2,3,4 on one inhalation and the same on the exhalation. Keep it rhythmical. Gradually extend the time for each respiration until you are taking only three or four breaths to a minute. This exercise can be practical while walking, riding or resting. When walking you can synchronize the counts with your steps. Gradual inhalation for seven seconds and gradual exhalation for seven seconds is appreciable.

Exercise 3: Practice holding the breath. Begin by retaining it only 15 seconds. In 5 second step increase the retention up to 45 seconds. Importantly, air needs to be taken into abdomen not into chest.

Exercise 4: Take a deep breath. With the hands over the abdomen pant vigorously through the open mouth. Note the quick response of the diaphragm and abdominal muscle with the rapid changes from inhalation to exhalation. Practice 20 pants at a stretch.

Exercise 5: Assume a good standing position, with chest up but not rigid; abdomen flat but not tense; shoulders, neck ; d jaw relaxed. Inhale deeply through the open mouth, and gently begin to say the alphabet. When you reach the end of it, begin over again without taking additional breath. Say the alphabets many times as you can on one breath, without permitting your chest to cave in. Be sure that all the alphabets are said loudly, clearly and equally spaced. Also be sure that speaking is accompanied by a gradual controlling and drawing in of the abdomen. At first you may not be able to say the alphabet more than twice on one breath; but if you practice regularly five or ten minutes a day, at the end of a few weeks you should easily say it six or eight times as your diaphragm and abdominal muscles gain strength and control.

Exercise 6: **Building** concepts of volume, intensity and projection.

- g) Prolong the vowel sound "ah" softly, at the normal pitch level.
- h) Now, gradually increase the loudness of the sound "all" in a monotone as long as the breath lasts and at the same time listen intently for symptoms of breathiness or strain. If these appear, stop and begin the exercise again.
- i) To make sure that you increase the sounds gradually imagine a person slowly walking away from you. As he recedes "reach" him with your voice, until a distance of about twenty feet is spanned.
- j) Now prolong "ah" at the maximum. (twenty-foot) loudness that can be attained without straining. A fielding sensation in the throat, coughing, and resulting hoarseness are all common signs of over strain. Stop the exercise as soon as these symptoms appear and repeat with minimum effort.
- k) Now, start with a twenty-foot volume and gradually decrease the loudness, assuming that the person is now slowly walking toward you. Always

direct your voice so that the imaginary person can hear you without straining.

) Alternate (b) and (e).

Exercise 7: On vowel /a/ practice double inflections, a rising pitch that drops off to a falling pitch. This kind of pitch bending in a single syllable word seems, as you will hear to convey sarcasm, uncertainty or double meaning.



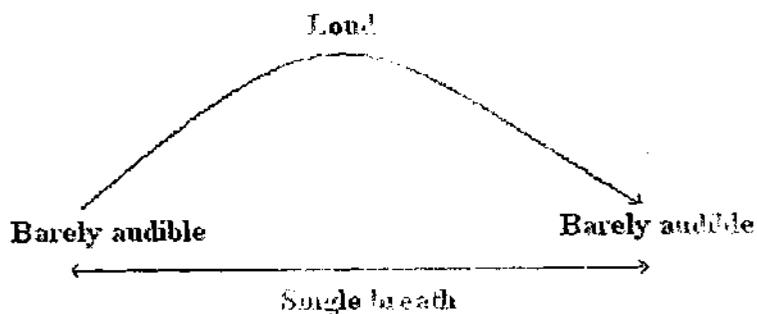
Exercise 8: Now practice changing pitch inflections on entire sentence. Read aloud the sentence below, making the pitch changes that are indicated. The words and syllables level with the dash are at your normal pitch; the others are above or below it.

WE HAVE GONE OVER IT A THOUSAND TIMES.
EVERY BODY WENT DOWN TOWN.
NEXT WEEK WE'RE DRIVING TO NEW MEXICO
WE BAKED THREE APPLE PIES AND TWO CHOCOLATE CAKES.
WHEN I GET OLDER, I'LL DYE MY HAIR BROWN.
WE WENT TO A PLAY AND THEN TOOK THE SUBWAY TO HER HOUSE.
HE CAMPAIGNED FOR THE DEMOCRATS AND LOST THE ELECTION.

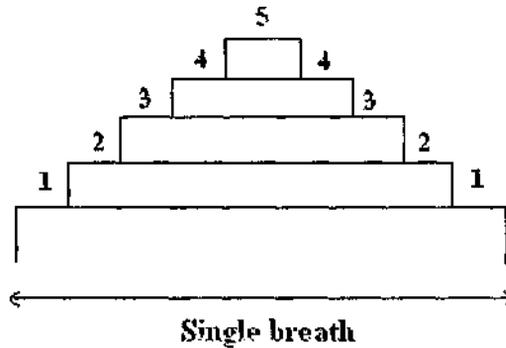
Exercise 9: Speak each of the following words with inflections (modulations of pitch during phonation) as indicated by the arrow and impart it to the meaning suggested.

Well (I am waiting)	Stop (Right there)
My (I am surprised)	Go (On a red light?)
Oh (Is that so?)	Say (That's excellent)
You (He meant you?)	Now (Don't wait)

Exercise 10: Initiate an "ah" in a tone which is barely audible, gradually increase the loudness of the "ah" until it is louder than your usually conversational voice and then reduce the loudness until the tone is again barely audible in single breath. Do not change the pitch or force the length of exhalation beyond a point of comfort.



Exercise 11: Count from one to five increasing the loudness on each number. Begin with a barely audible "one" and end with a "five" which can easily be heard across a forty-foot room.



Exercise 12: Say each of the following phrases or sentences three times increasing loudness from a normal conversational level to one that can easily be heard across a forty-foot room.

I'll go	Come back
Please	No
I won't	Enough

Exercise 13: Lengthen the vowel in each of the following words and maintain uniform loudness throughout the lengthened production of the vowel. Do not, however, distort the vowel by excessive lengthening.

Alms	Gnaw	Bomb	Thaw	Father
Walk	Pause	Tall	Awe	Mall

Exercise 14: Imagine yourself a drill sergeant and give your platoon the following orders. Remember, your voice should resemble a sergeant's voice having adequate loudness and authority in voice.

Forward, march Platoon, halt
About, turn At, case
To the rear, March Fall, Out

Exercise 15: Check your articulation. Are you a mumblor? Some people habitually fail to articulate sounds such as "t, d, sh, ch, k, g, f and v". Articulation and loudness usually go hand in hand. If you do not articulate clearly, no amount of volume will help you be understood. On the other hand, well-articulated speech at too low volume is still indistinct speech. Listen to a recording of your own speech. Do you make the sounds listed above as clearly as they can be made?

Exercise 16: Read the following word pairs. The second word in each pair should be completely without breathiness, while the first word requires an aspirate attack, which should be stopped as soon as possible as you get into the vowel sound.

Hit	It	Ham	Am	Heat	Eat
Had	Add	Hold	Old	Hair	Air
Hat	At	Hail	Ail	High	Eye
Hand	And	Head	Arm		

Read these word pairs until you can make the second word of each pair completely free of breathiness.

Exercise 17: Use relaxation exercises frequently. Immediately following a period of relaxation, inhale easily, letting your jaw drop relaxed. Start a yawn. As you start the exhalation for the yawn, easily and smoothly say 'hah'. Keep your throat as open as possible. Follow this exercise with one that includes the entire vowel sounds, prefacing each with the aspiratae 'h', 'hah', 'hay', 'hi', 'hii', 'ho' and 'hoo'.

Exercise 18: Produce the vigorous vocal sound of 'ah' without yawning, as in the preceding exercise, but try to employ the expansive sensation that accompanies the action of yawning. Repeat several times, but with each repetition add more volume and abdominal thrust to the tone. The sound emitted will resemble a deep groan, spontaneously released and forcibly projected. Do not restrain the tone, since the purpose of the exercise is to employ the spontaneous abdominal and diaphragmatic action of the yawn for the production of short, loud vocal sounds.

Exercise 19: After the preceding exercise has been perfected, read the same passage aloud, allowing only two beats for each syllabic vowel sound. Join all the words together as before. The sentence "slow speech helps us hear sounds we speak" would now be read aloud as follows:

Slo-o Spe-e-ch he-e-lps. U-u-s he-e-r sa-a-u-u-ndz we-e spe-e-k.

Exercise 20: Curl the upper lip up towards the nose. Curl the lower lip down towards the chin, purse the lips and then open and close the pursed lips in an action that resembles the mouth of a gold fish.

Exercise 21: Blow up the cheeks and then using your fingers "pop" the cheeks producing a sound as the air explodes the lips.

Exercise 22: Spread your lips for the sound of the vowel in eat. Round them for the vowel sound in ooze. Repeat eight times.

Exercise 23: Use the following sound combinations for repeated lip drill. Use exaggerated lip movement to work facial muscles. Saying first the sounds, then the words, perform each at least three times.

<i>Vowels</i>	<i>Sample words</i>
[i] - [as]	eat - at
[i] - [u]	eat - ooze
[ei] - [a]	ate - on
[el] - [u]	ate - ooze
[æ] - [u]	at - ooze
[u] - [i]	ooze - eat
[u] - [a]	ooze - on
[u] - [æ]	ooze- at

Consonants / Vowels	Sample words
[mi] - [bi]	me - be
[mi] - [bei]	me - bay
[mas] - [bae]	mat - bat
[mE] - [bE]	ball - ball
[mou] - [bou]	moat - boat
[mu] - [bu]	moot - loot

Exercise 24: Rotate your tongue around your lips, beginning at the right side. Repeat four times. Relax, beginning at the left side. Repeat four times. Relax.

Exercise 25: Extend your tongue again. This time wag it rapidly from side to side. Alternate this movement with up and down flapping. Add in vocalization.

Exercise 26: Say /a/. Observe the velum rising upward and backward. Now, produce the same movement without /a/. Perform several of these movements.

Exercise 27: Hold the lips tightly closed and fill the mouth and cheeks with as much forced breath as can be held, without allowing any of it to escape. Now suddenly, and without opening the lips, release all the breath through nose with a snort. This exercise should be practiced with very little breath pressure at first. Concentrate upon the valve like action of the soft palate muscle during the nasal breath release. Rest five to ten seconds between trials. Repeat often.

Exercise 28: Practice a series of short, explosive, whispered 'k' sounds without lowering the tongue arch. Try to capture the sensation of upward palatal movement during this exercise.

Exercise 29: Lift the tongue to the ridge behind the upper teeth and explode the consonant sequence /d/ /d/ /d/ /d/ and *Itl Itl Itl Itl*. Say each *IdJ* and *Ixl* 10 times. Lift the tongue as if you are saying /I/, then precede the /I/ by a series of vowels for example, /eel/ /ool/ /ahl/ /ohl/. Use a series of words containing /I/ to exercise the tongue upward movements; these can be done with children asking them to supply the words for example, *lorry, loud, light, cool, feel, hold, golden, lazy*.

Exercise 30: Sit or stand erectly. Using a full 60 seconds, permit your head to fall forward, roll to the left, to the right, and forward again. As you do so, feel the

stretching of neck muscles. Do not force a stretch but let the weight of your head pull the muscle. Reverse the direction of the bead roll. Spend about 5 minutes releasing the muscles, and then raise your head to an upright position.

300 சொற்களுள்ள பத்தி - Tamil

ஓர் ஊரில் ஒரு அந்தணன் இருந்தான். இவன் மிகவும் படித்தவன். எல்லாரும் அவனை மதித்து வந்தனர். ஆனால் இவன் மூடநம்பிக்கைகளைத் தெய்வமாக வணங்கிவந்தான். எந்தக் காரியத்தைச் செய்தாலும் மூட நம்பிக்கைகளுக்குக் கட்டுப்பட்டே நடந்து வந்தான். இதன்காரணத்தால் இவன் வாழ்க்கையில் பல இன்னல்களுக்கு ஆளானான்.

இவன் அதிகமாகச் சாப்பிட்டுக் கொழுத்து மிகவும் பருமனாக இருந்தான். ஆதலால் எல்லாரும் இவனைத் " தொப்பைக் கணபதி " என்று அழைத்துவந்தனர். விருந்துக்காக "யார் எந்த நிகழ்ச்சிக்கு அழைத்தாலும் முதலாவதாக அங்கு சென்றுவிடுவான்.

அங்கு தனபதி என்று ஒரு வியாபாரியும் இருந்தான். இந்தத் தொப்பை கணபதியும் வியாபாரியும் இளமையிலேயே நண்பர்கள். ஒருநாள் அந்தவியாபாரி

அவனுடைய இடது கால் இடறிவிட்டது. ஏனோ இன்று சகுனமே சரியில்லை என்று எண்ணிக் கொண்டு மீண்டும் சிலநிமிடங்கள் வீட்டிலேயே இருந்து கொண்டு நண்பனின் வீட்டை நோக்கி வேகமாக நடந்தான்.

ஏற்கனவே பெரிய வயிறு, அதோடு வேகமாக நடந்தகாரணத்தால் பிராமணனுக்கு மேலும் கீழுமாக மூச்சு இரைக்கத் தொடங்கியது. எப்படியோ மிகவும் கஷ்டப்பட்டு நண்பனின் வீட்டை அடைந்தான். ஏற்கனவே அங்கு விருந்துக்கு வந்திருந்தவர்கள் எல்லாரும் நன்றாகச் சாப்பிட்டுவிட்டு மகிழ்ச்சியாக அமர்ந்து வெற்றிலை போட்டுக் கொண்டிருந்தார்கள்.

இவ்வளவு தாமதமாக வந்த கணபதியிடம் தனபதி "ஐய்யய்யோ ! இப்பொழுதுதான் நீ வருகிறாயா? ஏன் இவ்வளவு தாமதமாக வருகிறாய்? சாப்பாடு எல்லாம் முடிந்து விட்டது என்று கூறி இரண்டு வாழைப்பழமும் ஒரு செம்புபாலும் வரவழைத்து கொடுத்தான்.

நெற்றியில் நாமம் போட்டுப் புது வேட்டியும் கட்டிப், பட்டுக் கவணியையும் தோளில் போட்டுக் கொண்டான். வீட்டிலிருந்து வெளியே கால் வைத்ததும் அவன் கண்ணில் ஒருகுஷ்டரோகி தென்பட்டான். "எனக்கு வேறு ஒரு கதியும் இல்லை. யாராவது பிச்சை போடுங்கள் ஐயா" என்று சொல்லிக் கொண்டே அவன் வந்தான்.

"ஐய்யய்யோ சகுனம் சரி இல்லை" என்று கூறிக்கொண்டு பிராமணன் வீட்டிற்குள் சென்றான்.

ஐந்து நிமிடங்கள் கழிந்து மீண்டும் வீட்டிற்கு வெளியே வந்தான். சிறிது தூரம் சென்றதும் ஒரு கறுப்புப்பூனை அவன் செல்லும் பாதையைக் கடந்துசென்றது. மேலும், அங்கு சென்று கொண்டிருந்த பிற பிராமணர்கள் இவனிடம் "என்னப்பா, தொப்பிபை கணபதி, நீ வரவில்லையா?" என்று கேட்டுக் கொண்டே சென்றனர். இவன் மீண்டும் சகுனம் சரியில்லை என்று வீட்டிற்குத் திரும்பிச்சென்றான். வீட்டில் ஒருசில நிமிடங்கள் பூனையையும் குஷ்டரோகியையும் சபித்த பின்னர் வீட்டிலிருந்து மறுபடியும் புறப்பட்டான். வீட்டு வாசற்படியைக் கடக்கும்போது

அவனுடைய மகளுடைய பிறந்தநாளாகக் கொண்டாட
அனேக நண்பர்களை அழைத்தான். பிராமணனையும்
அழைத்திருந்தான்.

தனபதி தன் இளமைக்கால நண்பன் மட்டுமல்ல
ஒரு பணக்காரனும் கூட. இதை எண்ணும்
போதே பிராமணனுடைய வாயில் எச்சில் ஊறியது. ஆனால்
அந்த வியாபாரியின் வீடு அந்தணனின் வீட்டிலிருந்து
ஆறு கல் தொலைவில் இருந்தது. பருமனாக
இருந்ததால் அவன் பேருந்தில் பயணம்
செய்யத்தயங்கினான்.

நடந்து சென்றால் உடலுக்கும் நல்லது. வயிறும் நன்றாகப்
பசிக்கும். பசிஎடுத்தால் விருந்தைச் சுவைத்துச்
சாப்பிடலாம் என்று எண்ணிக் கொண்டான்.

பிறந்தநாள் கொண்டாடும் நாளும் வந்தது. வேக
வேகமாகக் குளித்து எல்லா வேலைகளையும் முடித்துக்
கொண்டான்.

Kannada Reading Passage

ಒಂದು ಊರಿನಲ್ಲಿ ಒಬ್ಬ ಬ್ರಾಹ್ಮಣನಿದ್ದ. ಇವನು ತುಂಬಾ ವಿದ್ಯಾವಂತ,
ಗೌರವಸ್ಥೆ. ಆದರೆ ಮೂಢನಂಬಿಕೆಗಳೇ ಇವನಿಗೆ ದೇವರು. ಯಾವುದೇ
ವಿಚಾರದಲ್ಲೂ ಮೂಢನಂಬಿಕೆಗಳಿಗೆ ಕಟ್ಟುಬೀಳುತ್ತಿದ್ದ. ಇದರಿಂದ
ಜೀವನದಲ್ಲಿ ಇಲ್ಲದ ತೊಂದರೆಗಳಿಗೆ ಒಳಗಾಗಿದ್ದ.

ಇವನು ತಿಂದು-ಶೇಗಿ ತುಂಬಾ ದಢೂತಿ ಆಗಿದ್ದ. ಎಲ್ಲರೂ ಇವನನ್ನು
ತೂಣಪ-ಗಣಪ ಎಂದು ಕರೆಯುತ್ತಿದ್ದರು. ಪ್ರಾಚೀನವಾದ ಊಟ/
ಆದರೆ ಇವನಿಗೆ ತುಂಬಾ ಇಷ್ಟ. ಯಾರೇ ಊಟಕ್ಕೆ ಕರೆಯಲಿ,
ಯಾವುದೇ ಸಮಾರಂಭವಾಗಿ ಹಾಜರಾಗುತ್ತಿದ್ದ.

ಆತ್ಮೋಂದು ನಗರ ಧನಪತಿ ಎಂಬ ವ್ಯಾಪಾರಿ ಇದ್ದ. ತೂಣಪ/
ಬ್ರಾಹ್ಮಣನಿಗೂ ಇವನಿಗೂ ಬಾಲ್ಯದಿಂದಲೂ ಸ್ನೇಹ. ಒಂದು ಬಾರಿ/
ವ್ಯಾಪಾರಿಯ ಮಗನಿಗೆ ಪ್ರಾಚೀನವಾದ ಸಮಾರಂಭ ಜರುಗಿತು. ಸಾಕಷ್ಟು/
ಮಂದಿ ಗಣಪಿಗೆ ಕರೆ ಕಳುಹಿಸಿದ. ಬ್ರಾಹ್ಮಣನಿಗೂ ಕರೆಯೋಲಿ ಬಂತು.

ಪ್ರೀತಿಯ ಬಾಲ್ಯ ಸ್ನೇಹಿತನ ಮನೆ, ಜೊತೆಗೆ ಸಾಕಷ್ಟು ಸ್ನೇಹಿತನ/
ಮನೆಯ ಸಮಾರಂಭ. ಸ್ಮರಿಸುತ್ತಿದ್ದಂತೆ, ಬಾಯಿ ತುಂಬಾ ನೀರೂರಿತು./
ಆದರೆ ಅವನ ಮನೆ ಇದ್ದದ್ದು ಬ್ರಾಹ್ಮಣರಿದ್ದ ಊರಿನಿಂದ ಆರು/
ಮೈಲಿಗಳ ದೂರದಲ್ಲಿ ದಢೂತಿ ಇದ್ದುದರಿಂದ ಬಸ್ಸುಗಳಲ್ಲಿ

ಪೋಗಲು | ಸಹ | ತುಂಬಾ | ಮುಜುಗರ | ನಡೆದುಕೊಂಡೇ |
ಪೋದರಾಯಿತು | ಆರೋಗ್ಯವೂ | ಚೊತೆಗೆ | ಹಸಿದ | ಹೊಟ್ಟೆಗೆ | ಊಟವೂ |
ತುಂಬಾ | ರುಚಿಸುತ್ತದೆ | ಅಂದುಕೊಂಡ.

ಸಮಾರಂಭದ | ದಿನ | ಬಂತು | ಬೆಂಗಳೂರು | ದಿಗ್ಗಜನು | ಮುಗಿಸಿದ. | ಹಣೆಗೆ |
ಪಿಚೂತಿ | ಧರಿಸಿದ. | ನಾಲ್ಕು | ಬೆರಳಂಚಿನ | ಧೋತ್ರ | ಉಟ್ಟ | ಜರತಾರಿ |
ಶಾಲು | ಪೊದ್ದುಕೊಂಡ. | ಮನೆಯಿಂದ | ಹೊರಗೆ | ಕಾಲಿಡುತ್ತಿದ್ದಂತೆ | ಬಿಟ್ಟು |
ಕುಪ್ಪರೋಗಿ | ಕಾಣಿಸಿದ. | "ದಿಕ್ಕಿಲ್ಲ | ತುಂಬಾ | ಯಾರಾದ್ಯ | ದಾನ | ಮಾಡಿ |
ಆಪ್ತ | ಎಂದು | ರಾಗಾಲಾಪನೆ | ಮಾಡುತ್ತಾ | ಬಂದ. | ಧೂ | ಅಪಶಕುನ |
ಅಂದುಕೊಂಡು | ಮನೆಯೊಳಗೆ | ಹಿಂದಿರುಗಿದ.

ಐದು | ನಿಮಿಷದ | ನಂತರ | ಮತ್ತೆ | ಮನೆಯಿಂದ | ಹೊರಗೆ | ಬಂದ. | ಅತ್ಯಲ್ಪ |
ದೂರ | ಹೋಗುತ್ತಿದ್ದಂತೆ | ಐದು | ಕರಿಯ | ಬೆಕ್ಕು | ಇವನ | ಪ್ರಾದಗಳ |
ಮೇಲಿಂದ | ಹರಿದು | ಹೋಯಿತು. | ಅವನ | ಚೊತೆಗಾರ | ಬ್ರಾಹ್ಮಣರು |
"ಏನೀ | ಗಣಪಯ್ಯನವರೇ | ಬರೋದಿಲ್ಲೇ ?" ಎಂದು | ವಿಚಾರಿಸುತ್ತಾ |
ಮುಂದೆ | ಮುಂದೆ | ಹೋದರೂ | ಸಹ | ಇವನು | ಅಪಶಕುನ | ಆಯಿತೆಂದು |
ಮತ್ತೆ | ಮನೆಗೆ | ಹಿಂದಿರುಗಿದ. | ಮತ್ತೆ | ಐದಾರು | ನಿಮಿಷಗಳ | ಕಾಲ | ಬೆಕ್ಕು |
ಹಾಗೂ | ರೋಗಿಯನ್ನು | ಶಪಿಸುತ್ತಾ | ಮನೆಯಲ್ಲಿಯೇ | ಇದ್ದು |
ಮೂರನೆಯ | ಬಾರಿ | ಮನೆಯಿಂದ | ಹೊರಟ.

೧೧೭ ೧೧೮ ೧೧೯ ೧೨೦ ೧೨೧ ೧೨೨ ೧೨೩ ೧೨೪ ೧೨೫
 ಹೋಸಿಲ ಬಳಿ ಬರುತ್ತಿದ್ದಂತೆ ಮನೆಯ ಹೋಸಿಲಿನ ಬಳಿ ಎಡಪಾದ ತಾಕಿ
 ೧೨೬ ೧೨೭ ೧೨೮ ೧೨೯ ೧೩೦ ೧೩೧ ೧೩೨ ೧೩೩ ೧೩೪ ೧೩೫
 ಎಡವಿಡ. ಯಾಕೋ ಗ್ರಹಚಾರ ಸರಿಯಿಲ್ಲ ಅಂದುಕೊಂಡು ಇನ್ನೂ
 ೧೩೬ ೧೩೭ ೧೩೮ ೧೩೯ ೧೪೦ ೧೪೧ ೧೪೨ ೧೪೩ ೧೪೪ ೧೪೫
 ಕೆಲವು ನಿಮಿಷಗಳ ಕಾಲ ಮನೆಯೊಳಗೇ ಇದ್ದು ಮತ್ತೆ ಬೇಗ ಬೇಗ
 ೧೪೬ ೧೪೭ ೧೪೮ ೧೪೯ ೧೫೦ ೧೫೧ ೧೫೨ ೧೫೩ ೧೫೪ ೧೫೫
 ಸೇಪಿತನ ಮನೆಯ ಕಡೆ ನಡೆದ.

೧೫೬ ೧೫೭ ೧೫೮ ೧೫೯ ೧೬೦ ೧೬೧ ೧೬೨ ೧೬೩ ೧೬೪ ೧೬೫
 ಮೊದಲೇ ಬೊಜ್ಜು ಹೊಟ್ಟೆ ಬೇಗ ಬೇಗ ಹೆಜೆ ಹಾಕುತ್ತಿದ್ದಂತೆ,
 ೧೬೬ ೧೬೭ ೧೬೮ ೧೬೯ ೧೭೦ ೧೭೧ ೧೭೨ ೧೭೩ ೧೭೪ ೧೭೫
 ಬ್ರಾಹ್ಮಣನಿಗೆ ಮೇಲುಸಿರು ಹೆಚ್ಚಾಯಿತು. ಹಾಗೂ ಹೀಗೂ ಕಷ್ಟದಿಂದ
 ೧೭೬ ೧೭೭ ೧೭೮ ೧೭೯ ೧೮೦ ೧೮೧ ೧೮೨ ೧೮೩ ೧೮೪ ೧೮೫
 ಸ್ನೇಹಿತನ ಮನೆ ತಲುಪಿದ. ಹೋಗಿದ್ದವರೆಲ್ಲರೂ ಊಟ ಮಾಡಿ ಕೆಲ
 ೧೮೬ ೧೮೭ ೧೮೮ ೧೮೯ ೧೯೦ ೧೯೧ ೧೯೨ ೧೯೩ ೧೯೪ ೧೯೫
 ತೊಳೆದುಕೊಂಡು ಸಂತೋಷದಿಂದ ತೂಗುತ್ತಾ ತಾಂಬೂಲ
 ೧೯೬ ೧೯೭ ೧೯೮ ೧೯೯ ೨೦೦ ೨೦೧ ೨೦೨ ೨೦೩ ೨೦೪ ೨೦೫
 ಪಡೆಯುತ್ತಿದ್ದರು.

೨೦೬ ೨೦೭ ೨೦೮ ೨೦೯ ೨೧೦ ೨೧೧ ೨೧೨ ೨೧೩ ೨೧೪ ೨೧೫
 ಇಷ್ಟು ಹೊತ್ತು ಮೀರಿ ಬಂದ ಬ್ರಾಹ್ಮಣನನ್ನು ಕಂಡು ಧನಪತಿ
 ೨೧೬ ೨೧೭ ೨೧೮ ೨೧೯ ೨೨೦ ೨೨೧ ೨೨೨ ೨೨೩ ೨೨೪ ೨೨೫
 ಪೇಚಾಡಿದ 'ಯಾಕಯ್ಯಾ ಇಷ್ಟು ತಡವಾಡಿದೆ? ಊಟದ ವೇಳೆಯೇ
 ೨೨೬ ೨೨೭ ೨೨೮ ೨೨೯ ೨೩೦ ೨೩೧ ೨೩೨ ೨೩೩ ೨೩೪ ೨೩೫
 ಮುಗಿದು ಹೋಗಿತೇ? ಅನ್ನುತ್ತಾ ಎರಡು ಬಾಳೆಹಣ್ಣು ಒಂದು
 ೨೩೬ ೨೩೭ ೨೩೮ ೨೩೯ ೨೪೦ ೨೪೧ ೨೪೨ ೨೪೩ ೨೪೪ ೨೪೫
 ಲೋಟ ಹಾಲು ತರಿಸಿಕೊಟ್ಟ.

೨೪೬ ೨೪೭ ೨೪೮ ೨೪೯ ೨೫೦ ೨೫೧ ೨೫೨ ೨೫೩ ೨೫೪ ೨೫೫
 ಬ್ರಾಹ್ಮಣ ಅಷ್ಟರಿಂದಲೇ ತುಪ್ಪಿಪಟ್ಟು ಬಂದ ದಾರಿಗೆ ಸುಂಕ ಇಲ್ಲ
 ೨೫೬ ೨೫೭ ೨೫೮ ೨೫೯ ೨೬೦ ೨೬೧ ೨೬೨ ೨೬೩ ೨೬೪ ೨೬೫
 ಅನುವಂತೆ ಸಾಕೋ ಸಾಕಾಗಿ ನಡೆದುಕೊಂಡೇ ಮನೆಗೆ ಬಂದ.
 ೨೬೬ ೨೬೭ ೨೬೮ ೨೬೯ ೨೭೦ ೨೭೧ ೨೭೨ ೨೭೩ ೨೭೪ ೨೭೫
 ಆಗಲೂ ಇವನಿಗೆ ಮೂಢನಂಬಿಕೆಗಳಲ್ಲಿದ್ದ ವಿಶ್ವಾಸ ಅಳಿದಿರಲಿಲ್ಲ.
 ೨೭೬ ೨೭೭ ೨೭೮ ೨೭೯ ೨೮೦ ೨೮೧ ೨೮೨ ೨೮೩ ೨೮೪ ೨೮೫
 'ಹಾಳು ಬೆಕ್ಕು ಕುಷ್ಟರೋಗಿ ಈ ದಿನ ನನಗೆಲ್ಲಿ ಕಾದಿದ್ದರೋ

೨೮೬ ೨೮೭ ೨೮೮ ೨೮೯ ೨೯೦ ೨೯೧ ೨೯೨ ೨೯೩ ೨೯೪ ೨೯೫
 ಅಂದುಕೊಂಡೇ ಮಲಗಿದ. ಎಡವಿದ್ದ ಪಾದದ ನೋವು ಇವನ ನಿದ್ರೆಗೂ
 ೨೯೬ ೨೯೭ ೨೯೮ ೨೯೯ ೩೦೦ ೩೦೧ ೩೦೨ ೩೦೩ ೩೦೪ ೩೦೫
 ಭಂಗ ತಂದಿತು.

300 words passage (Telugu)

ఒక ఊళ్లో ఒక బ్రాహ్మణుడు ఉండేవాడు. ఇతను గొప్ప విద్యావంతుడు, గౌరవనీయుడు. కాని మూఢనమ్మకాలే ఇతనికి దేవుళ్ళు. ఏ విషయంలోనైనా మూఢ నమ్మకాలకు కట్టుబడి ఉండేవాడు. ఇందువల్ల జీవితంలో తేని కష్టాలకు గురయ్యాడు.

ఇతను బాగా తిని భారీకాయుడు అయ్యాడు. అందరూ ఇతన్ని బొజ్జవాడు, గణపతి అని పిలిచేవారు. పుష్టికరమైన భోజనం అంటే ఇతనికి చాలా ఇష్టం. ఎవరు భోజనానికి పిలిచినా, ఏ కార్యక్రమం జరిగినా హాజరయ్యేవాడు.

అక్కడొక నగరం. ధనపతి అనే వ్యాపారి ఉండేవాడు. బొజ్జ బ్రాహ్మణునికీ ఇతనికీ బాల్యం నుంచే స్నేహం ఉండేది. ఒకసారి వ్యాపారి కుమారునికి పుట్టినరోజు పండగ జరిగింది. ఆ కార్యక్రమానికి అనేకమంది పెద్దలను ఆహ్వానించాడు. బ్రాహ్మణుణ్ణి కూడా ఆహ్వానించాడు.

ప్రియమైన బాల్యస్నేహితుని ఇల్లు, దానికి తోడు షావుకారు స్నేహితుని ఇంటి కార్యక్రమం, తలచుకుంటేనే

నోటినిండా నీళ్ళూరాయి. అయితే బ్రాహ్మణుడున్న ఊరినుంచి ఆరుమైళ్ళు దూరంలో అతని ఇల్లు ఉంది. భారీకాయుడు కావడంతో బస్సుల్లో పోవడానికి కూడా సంకోచమే. నడచుకొనిపోతే సరి. ఆరోగ్యమూ దానికితోడు పొట్టకు భోజనం బాగా రుచిస్తుంది అని అనుకొన్నాడు.

కార్యక్రమం రోజు రానే వచ్చింది. తొందరగా స్నానాదులను ముగించాడు. నుదుటికి విభూతి ధరించాడు. నాలుగు వేళ్ళ అంచున్న పంచెను కట్టి, జరీ శాలువాను కప్పుకొన్నాడు. ఇంటినుంచి కాలు బైట పెట్టగానే ఒక కుష్టురోగి కనిపించాడు. దిక్కులేదు తండ్రో, ఎవరైనా దానం చెయ్యండయ్యా! అంటూ రాగాలుతీస్తూ వచ్చాడు. "ధూ అపశకునం" అనుకొని ఇంటిలోపలికి వెనుదిరిగాడు.

ఐదు నిమిషాల తర్వాత మళ్ళీ ఇంటినుంచి వెలుపలికి వచ్చాడు. కొంచెం దూరం పోగానే ఒక నల్ల పిల్లి ఇతని పాదాల పైనుంచి వెళ్ళింది. అతని జతనున్న బ్రాహ్మణులు "ఏమండీ! గణపతిగారూ! రావటం లేదా?" అంటూ విచారిస్తూ ముందుకు పోయినా కూడా ఇతను అపశకునం అయ్యిందని మళ్ళీ ఇంటికి వెనుదిరిగాడు. నువ్వీ ఐదారు నిమిషాల సేపు ఇంట్లోనే ఉండి,

గడప దగ్గరికి రావడంతోచే ఇంటి గడప దగ్గర ఎడమకాలు తగిలి పడ్డాడు. ఏమిటీ కర్మ. సరిలేదు అనుకొంటూ అంకా కొన్ని నిమిషాలపాటు ఇంట్లో ఉండి, మళ్ళీ తొందర తొందరగా స్నేహితుని ఇంటివైపు నడిచాడు.

అసలే బొజ్జ పొట్ట. తొందర తొందరగా అడుగులు వేయడం వల్ల బ్రాహ్మణునికి ఎగశ్వాస ఎక్కువైంది. ఎలాగో అలాగా కష్టపడి స్నేహితుని ఇంటికి చేరుకొన్నాడు. వచ్చినవారంతా భోజనం చేసి, చేతులు కడుక్కొని, సంతోషంతో తూగుతూ తాంబూలం వేసుకుంటున్నారు.

ఇంత పొద్దు పోయి వచ్చిన బ్రాహ్మణుణ్ణి చూసిన ధనపతి గొణుక్కుంటూ ఎందుకయ్యా ఇంత ఆలస్యం చేశావు? భోజనం వేళ దాటిపోయిందే! అంటూ రెండు అరటిపళ్ళు, ఒక లోటా పాలు తెప్పించి ఇచ్చాడు.

బ్రాహ్మణుడు అంతదానికే తృప్తిపడి, వచ్చిన దారికి సుంకం లేదు అన్నట్లు చాలబ్బా చాలని, నడచుకొని ఇంటికి

వచ్చాడు. అయినా ఇతనికి మూఢనమ్మకాలమీద ఉన్న విశ్వాసం పోలేదు. పాడు పిల్లి, కుష్టురోగి ఈరోజు నాకోసమే కాచుకున్నాయి అనుకొని పడుకున్నాడు. తట్టుకొన్న కాలు నొప్పి ఇతని నిద్రకూ భంగం కలిగించింది.

మూఢనమ్మకాల మీద విశ్వాసం వల్ల బాంజ్జగణాధికారి
బాంజ్జసిందూ దుచికరమైన తిండికి బదులు కాలునొప్పి
సరాక నిశ్చయాల ఎదురైనాయి. చూసారా మూఢనమ్మకాల
వల్ల కలిగే వశతామం.