



The Speech Mechanism

Dr. Sunita Rana

Associate Prof. & HEAD, App. Sc., HITM, Dheen

Abstract:

According to the 2001 census of India, English is spoken by more than 35 million Indians. This means that India is the fourth largest English speaking country in the world. Since there are fifty five countries which use English as an official language, this makes India of major importance in the English speaking world. Each country where English is used has its own 'accent'-that is its own characteristic method of pronunciation. In each country, however, there is a 'received' or 'approved' accent which is normally used for business, administration, in the legislature, On the Radio or T.V or for academic work. These accents are called 'received' because they are most widely understood by people, even by people who speak their own accents. They are called 'approved' because they spoken as 'correct' or 'good' accents. The whole purpose of learning English is to be able to communicate with other people easily.

Keywords: *Language, Organs of speech, Syllable, Vowel, Consonant Monophthongs, Diphthongs*

Introduction

We use language everyday without devoting much thought to the process, but articulatory movement-the movement of the lips, tongue and other organs is among the subtlest and most adept of any actions performed by human beings. Speech is a natural form of Communication for human beings. So we must learn about the mechanism by which speech is produced and perceived. We use speech everyday almost unconsciously, but an understanding of the mechanism on which it is based will help to clarify how the brain processes information and will also lead to the development of more about human mechanism.

The Speech Mechanism

Before telling about Speech Mechanism I want to tell you about language. What is language? Language is a system of Communication through speech and written language is an attempt to represent the spoken language by visual symbols. There are so many languages speak in our country. In these languages English is the most important and now is a common language all over the world. English is spoken over such a large part of the world that a number of slightly different accents are used by native speakers of the language.

Spoken English In India

English as spoken by educated people in India does not differ radically from native English in grammar and vocabulary, but in pronunciation it is different from both British and American English. Even within India there are a large number of regional varieties, each different from the other in different ways, and retaining to some extent the phonetic patterns of the Indian language spoken in that particular region. These regional varieties of English are sometimes not even mutually intelligible. In every region, however, there are people who have shaken off the gross features of regional accent and speak a more 'neutral' form of Indian English. It is also true that in every region there are good speakers of English and bad speakers of English, the terms 'good' and 'bad' referring to the degrees of approximation to native English and Standard Indian English and also to qualities of clear, effective and intelligible speech. It would, however, be better to aim at international intelligibility.[1]

A Speech Event

A speech event involves a series of operations. A concept is first formulated in the speaker's brain and its linguistic codification transmitted by the nerves to the speech organs which are set in motion. The movements of these organs set up disturbances in the air, and these sound waves are received by the listener's ear. His nervous system carries the message to the brain, where it is interpreted in linguistic terms. The speaker and the listener must share the same linguistic code in order to communicate effectively.

The Production Of Speech

The energy for the production of speech provided by the air-stream coming out of the lungs. At the top of the wind pipe or the trachea, is the larynx containing the vocal cords. These can be brought together or kept apart, the opening between them being called the glottis. when we cough, the glottis is tightly closed and the air from the lungs is held up beneath it and then suddenly released. When we breathe out, the glottis is held open. If the vocal cords are held sufficiently close together, they vibrate when the air from the lungs passes between them. This vibration produces voice. speech sounds can be voiced or voiceless.

The air stream is also modified by the resonating cavities above the larynx-the pharynx, the mouth and the nasal cavity. The shape of the mouth cavity depends on the positions of the tongue and the lips. The roof of the mouth is divided into three parts: the alveolar ridge or teeth ridge just behind the upper teeth: the hard palate; and the soft palate or velum, the end of which is called the Uvella.[2]

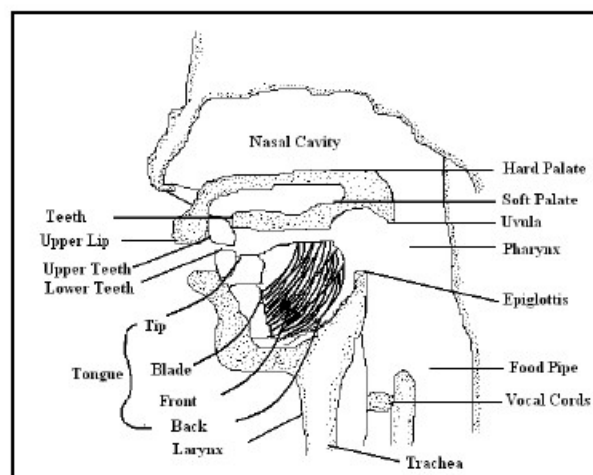


Figure1: The Production of Speech

Organs Of Speech

The organs of speech which constitute the PHONATORY and ARTICULATORY SYSTEM can be divided into three groups:

The Respiratory System

It consists of lungs, the muscles of the chest and the wind pipe.

The Phonatory System

It includes Pharynx and the Larynx.

The Pharynx

It is a tube that begins just above the larynx. As its top, it is divided into two parts, one part being the back of the mouth and the other being the beginning of the way through the nasal cavity.

The Larynx

The larynx is in the neck. It has several parts. The air stream after having been released from lungs comes through the larynx. It has two vocal cords. The front of vocal cord is joined but it is separated at the back. The opening between the vocal cords is called glottis.

The vocal cords are loosely held together when the pressure of air stream comes from the lungs, they begin to vibrate and this vibration of vocal cords produces sound.

Articulatory System

It consists the nose, the mouth including the tongue, the teeth, the lips and the roof of the mouth (it is divided into three parts) they are;

The Teeth Ridge

It is between the top front teeth and the hard palate. We can feel its shape with touching our tongue. Its surface is rough and covered with little ridges.

The Hard Palate

The hard surface that follows the teeth ridge is called the hard palate. It is often called the roof of the mouth. We can feel its smooth cover surface with our tongue.

The Soft Palate

The back part of the roof is called the soft palate or the velum. It is always in a position that allows air to pass through the nose and through the mouth. It is a soft fleshy area with a small, soft and delicate structure called uvella hanging at its end. The soft palate can be lowered to let the air escape through the mouth. This is the normal position in breathing. If the mouth passage is also open, a nasalized vowel, as in Hindi /hae/ 'are' is produced, e.g., English /m/ and /n/ in man /maen/, and /ng/ in sing /sin/.

The Tongue

The surface of the tongue is divided into five parts:

(i) The tip, (ii) The blades, (iii) The front part, (iv) The back part, (v) The root.

The position of tongue lying just behind the lower teeth is called the tip, the blades lie apposite the teeth ridge. The front part lies apposite the hard palate and the back part lies apposite the soft palate. In the production of vowel sound, the tip of the tongue is generally kept low, and some other part of the tongue-the tip front, the centre or the back-is raised towards the roof of the mouth.

The Teeth

Upper and lower front teeth. The upper front teeth play an important role in the production of various consonant sounds. The tip of the tongue touching the back side of upper front teeth leads to the production of the consonant sounds called dental.

The Lips

The lips can be tightly shut or loosely brought together or kept with a narrow gap in between or drawn apart. The lips at different positions articulate different vowel sounds. They can be pressed together, brought into contact with the teeth or they can be rounded to produce lip-shape vowels like 'u'.

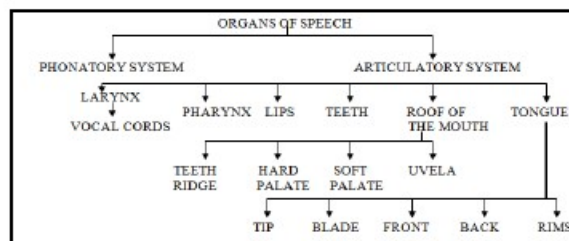


Figure 2: Organs of Speech

These are the organs of speech. Now we should know about the basic continuants like Syllable, Vowel, and Consonant. They are used in the description of speech and include information concerning the production, transmission and reception stages of sounds. There is always a sound in terms of the movements of the organs of speech. So we have the nature of the sound which is perceived and the features preserved by a listener in a language.

Syllable

The syllable is a unit of pronunciation which consists of one vowel only or a vowel with one or more consonants. A vowel is the nucleus and consonant a marginal element in the syllable. In each syllable there is one sound that is more prominent than the rest. Usually it is a vowel, e.g. /i:/ in beat /bi:t/, but in English it can also be a consonant, e.g. /n/ and /l/ in the second syllable of cotton (R.P. / 'kɒtn/) and table (R.P. / 'teɪbəl/). A syllable also corresponds to a chest pulse, a muscular movement pushing the air out of the lungs.

Vowel

A vowel is a speech sound in the production of which the air comes out of the mouth without any obstruction at all. In phonetic terms, in the production of vowel sounds, there is no obstruction in the pharynx and the mouth and no narrowing of a degree that would cause audible friction. For instance, mouth when the air is coming out of the mouth in uttering these words. In the production of vowels the air from the lungs comes out in a continuous stream through the mouth, and the vocal cords vibrate to produce 'voice'. There is no closure of the air passage and no narrowing that would cause friction. The note produced by the larynx is modified by the shapes of the resonating cavities of the pharynx, the mouth and the nose. These in turn depend on the positions of the soft palate, the tongue and the lips. The soft palate is raised for oral vowels; all English vowels are oral. If the soft palate is lowered, we get nasalized vowels, which are used in Hindi, for instance.

Any part of the tongue can be raised towards the roof of the mouth, and there can be different degrees of rising of the tongue. Vowels in the production of which the highest part of the tongue is the front are called front vowels, e.g., English (R.P.) /i:,r, æ,λ/; those in which it is the back are called back vowels, e.g., English (R.P.) /a:,o,c,u,u:/; and those in which it is the centre are called centre vowels, e.g., English (R.P.) /ɜ:,ə/. According to the degree of raising of the tongue, vowels are divided into four

categories-close (as near as possible to the roof of the mouth without causing friction or making a closure), e.g., English / i:, u:/; half-close; half open; and open (as low as possible), e.g., English (R.P.)/ a:,o/).

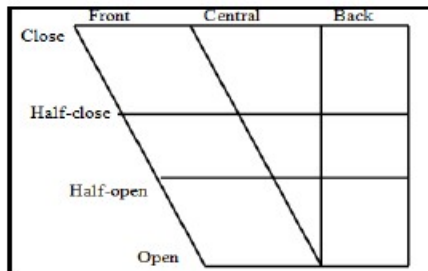


Figure 3: Speech Sound

The lips can be spread, as for English /i:/; neutral, as for English (R.P.) /e/; open, as for English (R.P.)/a:/; open rounded, as for English (R.P.)/o/; or close rounded, as for English /u:/.

If the quality of a vowel does not change, it is sometimes called a pure vowel, e.g., English (R.P.)/ i:,a:,e,u:/. Vowels which involve a gliding movement from one quality to another are called diphthongs, if the glide takes place within the same syllable.

Consonants

The sound during the production of which we hear friction are called consonants e.g., pronounce the word 'Shoe', 'See' and 'Zoo', we will hear friction during the production of sounds represented by the letters (Sh) , (S), (Z) . So, all these sounds are consonants. As we know there are twenty four consonant sounds in English.

Description Of Consonant

A consonant is a speech sound in the production of which there is some hindrance to the air stream at some point in the mouth. For instance, pronounce the 'P' sound in the word 'pen'. We will see that in the production of 'p' sound, our lips first meet each other closely. There is a complete obstruction of air coming out .Of, course it is momentary. Then the lips are separated and the air comes out .If we speak 'f' sound in the word 'fun'. There is some hindrance caused by the upper teeth and the lower lip.

Again, if we pronounce the word 'bee'. There are two sounds here-one represented by the letter 'b' and the second represented by 'ee'. In the production of sound 'ee' we have raised the front of our tongue fairly high. There is an appreciable degree of narrowing in

the mouth. But this degree of narrowing is not sufficient to cause any audible friction or in the resultant sound. So the sound produced is vowel. There is the second sound represented by the letter 'b'. Pronounce the sound 'b' we will see that we have made a complete closure to the mouth. We have brought the two lips together. There is some sudden release of air behind our lips. There is some obstruction, of course, for some time and then the air passes out from lungs. So we have seen that the sound produced is a consonant. If we pronounce other word 'sees'. It also consists of two sounds 's' and 'ee'. The first one 's' is a consonant sound and the second one 'ee' is a vowel. In the production of 's' sound, the tip and blade of the tongue rise high towards the teeth ridge. It creates a degree of narrowing. The air passes out only with audible friction. There is also a hissing sound which is very characteristic of the 's' sound. So we have seen that the narrowing of a degree in the production of 'b' and 's' sounds have caused audible friction and hence they are consonants and 'ee' is a vowel because there is no friction in the production of this sound. A consonant is usually described by taking into account (whether it is voiceless or voiced) its place of articulation and its manner of articulation.

Voiced And Voiceless

Speech sounds are classified as voiceless or voiced. In the production of voiceless sounds, the vocal cords are wide apart and the glottis is wide open. So, air can pass freely without setting the vocal cords into vibration e.g., The initial sounds in English words cot, chair, film, hot, pot, sheet, thin, ten are voiceless. In the production of voiced sounds, the vocal cords are held loosely together and the air from the lungs can pass only by setting them into vibration e.g., the initial sounds of English words like bed, dead, get, jug, men, nest, red, late, very etc. are voiced.

Manner Of Articulation

The manner of articulation specifies the kind of closure or narrowing involved in the production of a sound. These are given the labels as plosives, nasal, fricative, etc. to the consonants according to the manner of articulation.

Plosives (6), (p, b, t, d, k, g)

Sounds which are produced with a stricture of complete closure and sudden release are called plosives e.g., the initial sounds in bin, din, kin, pin, tin and gun are plosives. Herein the active articulators (the lower lip and the tongue) and the passive articulators

(upper teeth and the entire roof of the mouth) come in contact with each other. The lung air is prevented from escaping through the mouth. Soft palate is also lowered to shut the nasal passage. Thus, the lung air is blocked in the mouth. When the active articulator is suddenly removed from the passive articulator, the air escapes with a small explosive sounds.

Affricative (2), (ts, dʒ)

Sounds which are produced with a stricture of complete closure and slow release are called affricates. The initial sounds in chin, chair, jug and jam are affricate consonants. Herein the active and passive articulator comes close together. The oral and nasal passage is blocked. Then the active articulator is slowly removed from the passive articulator and a sound of slight friction is heard.

Nasals (3), (m, n, ŋ)

Sounds which are articulated with a stricture of complete oral closure and nasal release are called nasals e.g., the final sounds in the words like ram, sum, ran, sun, sang and sung. Herein, the active and passive articulators are in firm contact with each other. The oral passage is completely blocked. When the soft palate is lowered, the air passes through nostrils freely producing nasal consonants.

Fricative (9), (t,v,θ,ð,s,z,ʃ,h)

Sounds which are produced with a stricture of close approximation are called fricatives e.g., the initial sounds in five, hat, fail, sip, zip, then, vine are fricatives. The fricatives are produced when active and passive articulators come together and there is a narrow gap between them. The soft palate is raised to shut off the nasal passage of air. The air from the lung escapes through the narrow space between the active and passive articulators producing audible friction.

Laterals (1), (l)

Sounds which are articulated with a stricture of complete closure in the centre of the vowel tract and the air escapes along the sides of the tongue without any friction e.g., l sound in the word love, let, tell.

Frictionless Continuant (1),(r)

Sounds which are articulated with a stricture of intermittent closure are called frictionless continuant e.g., letter 'r' in red, ran and rat.

Semi-vowels (2), (w,j)

The sounds which are articulated with a stricture of open approximation (gap wide between active and passive particular and nasal passage closed) are called semi-vowels e.g., the initial sounds in yes and wet. [3]

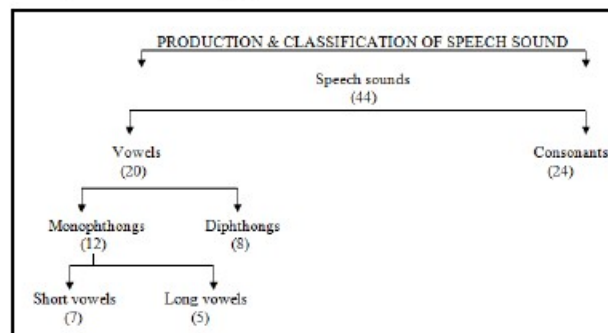


Figure 4: Classification of Speech Sound

Monophthongs

English language has 20 vowels out of which 12 are pure vowels or monophthongs and 8 are vowel glides or diphthongs. A pure vowel is one which remains constant and does not glide. When the tongue position remains unchanged during the production of a vowel, the vowel produced is pure vowel or Monophthongs e.g., pronounce the words like /a/, /u/, /i/. We must have observed that there is only one sound here.

- Short Vowels

There are seven pure short vowels;

/i/ - sit/ /sit/, fill /fil/, live /liv/, ticket /tikit/.

/æ/ - cat/kæt/, back /bæk/, tax/tæks.

/e/ - ten /ten/, bed /bed/, dead /ded/, head /hed/, wreck /rek/.

/ʌ/ - cup /cʌp/, dust /dʌst/, pump /pʌmp/.

/o/ - pot /pot/, caught /kot/, fond /fond/, off /of/.

/u:/ - book /buk/, cook /cuk/, wood /wud/, look /luk/.

/ə/ - sentence /sentəns/, effort /e'fə't/

- Long Vowels

There are also five pure long vowels;

/i:/ - see /si:/, feed /fi:d/, cream /kri:m/, beans /bi:nz/

/ɔ:/ - saw /sɔ:/, all /ɑ:l/, board /bɔ:d/.

/ɑ:/ - father /fɑ:ðer/, hard /hɑ:d/, bath /bɑ:θ/.

/u:/ - too /tu:/, suit /su:t/, lose /lu:z/, duty /dju:ti/.

/ɜ:/ - bird /bɜ:d/, third /θɜ:d/, girl /gɜ:l/.

Diphthongs

The Greek meaning of 'Diphthong' is double sound. These sounds involve a movement from one vowel to another in their articulation. During their articulation the tongue from the position required for the articulation of one vowel towards the position required for the articulation of another vowel towards the position required for the articulation of another vowel. But a diphthong during its articulation never reaches the end point, it only achieves an approximation to it and that is why the first part of a diphthong is much longer and stronger than the second part; e.g.,

/ei/ bait/, beit/, mail/ meil/, /pain/ pein/, /face/ feis/.

/ai/ five/ faiv/, mine/ main/, climb/ klaim/.

Places Of Articulation

- Bilabial (4), (P, b, m, w)-Articulation by two lips.
- Labio dental (2), (f, v) Articulation by the lower lip against the upper teeth e.g., English /f, v/, Hindi and Indian English. /v/.
- Dental: - (2), (θ), (thick), (ð), (this)) Articulation by the tip of tongue against the upper teeth, e.g.; English /θ, ð/, Hindi and Indian English.
- Alveolar:- (6), (t, d, s, z, n, l) Articulation by the tip or blade of the tongue against the teeth ridge, e.g., English /t, d, s, z, n, l/.
- Post Alveolar: - (1), (r) Articulation by the blade of the tongue against the back of the teeth ridge, e.g., English /r/.
- Palato-Alveolar:- (4), (s, ts, dʒ, ʒ) Articulation by the blade of the tongue against the teeth- ridge with the front of tongue raised towards the hard palate, e.g., English /ts, dʒ, s, z/

- Palatal: - (j), (y) Articulation by the front of the tongue against the hard palate, e.g., /j/.
- Velar; - (k, g, n) Articulation by the back of the tongue against the soft palate, e.g., English /k, g, n/.
- Glottal:- (h) Articulation because of an obstruction between or narrowing of the vocal cords, e.g., English /h/. [1]

Conclusion

To speak we use a special mechanism to produce sound with the help of a energizer, a vibrator and resonators. The energizer is the exhaled breath, the vocal cords acts as the vibrator and the resonators are the passages of the throat, mouth and nose. The air-stream, when it passes from lungs through windpipe to the mouth or the nose produces sound when the air-stream passes through the mouth or the oral passage oral sounds are produced, when it passes through the nose or the nasal passage nasal sounds are produced. Mechanism means the mechanism involved in the production of speech sounds. It is actually the air we breathe out during respiration, on its passage through the mouth (oral cavity) or nose (nasal cavity) or sometimes both, is modified in speech sounds due to certain movements of organs involved in the passage.

Reference

1. Bansal, R.K., "The Intelligibility of Indian English", University of London, Ph.d. Thesis, 1996, Vol. 1 Pp.38-39.
2. Bansal R.K, Harrison J.B, Spoken English: "A manual of speech and phonetics", second edition, 1983 by Oriented Longman Private Limited.
3. Dr. Khurana K.K (M.A, M.Phill, Ph.d, Head P.G. Department of English DAV College, Ambala City) "Communication skills in English" published by Ishan Publications, 2008-09 (first edition), p-188-191.
4. Bansal R.K, Harrison J.B, Spoken English: "A manual of speech and phonetics", second edition, 1983 by Oriented Longman Private Limited.