

Unit - 2

I. Phonetics and Phonology

Language is expressed by humans in speech and writing. Messages are conveyed by building sentences or producing utterances. These sentences are constructed with words arranged in a definite order which, in turn, are made of sounds, patterned together. Thus, sounds are the basic building blocks of language. For language expressed through speech, the sounds produced by the speaker are of prime significance. Production of each sound, which contributes to forming a word, involves a specific physiological process. This scientific study of sounds that can be produced by human vocal tract is known as **phonetics**. The study of how speakers systematically select specific sounds in specific patterns to express specific meaning is what we term as **phonology**.

It can be well understood that before producing the message (through speech), the speaker first conceives it in his/her mind. How the speaker conceives a thought to be conveyed through a language and consequently produces it through speech which ultimately reaches the hearer for comprehension, is presented by the **speech chain model** presented in Denes and Pinson (1973) (McGregor 2009: 28-29):

- A thought is perceived by the speaker in his/her brain.
- This thought is encoded in language.
- Messages are sent to the vocal apparatus from the brain of the speaker.
- The organs and muscles in the vocal tract act together to produce the required sounds.
- The necessary muscles and organs get positioned and are set in motion.
- These lead to the production of the specific sounds.
- These sounds travel through the air to reach the hearer's ear.
- Here, the sounds are converted to electrical signals and these electrical signals travel to the brain of the hearer through the auditory nerves.

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- The impulses are decoded in the hearer's brain. This decoding makes the hearer arrive at a thought (which should be ideally similar to the thought that the speaker had and wanted to convey through the message produced).
- The sound waves also reach the speaker's ear and are sent to speaker's brain in the form of electrical signals through auditory nerves. The speaker's brain too decodes the message and compares the actual utterance with the message that was intended to be conveyed by the speaker when thought emerged in the speaker's brain. This is known as feedback loop.

Thus, the linguistic field of phonetics deals with three aspects of analyzing speech sounds –

Analyzing the production of speech sounds – known as **articulatory phonetics**;

Analyzing the physical properties of sound waves – known as **acoustic phonetics**;

Analyzing the perception of speech sounds – known as **auditory phonetics**.

The sounds that are produced in any language of the world are represented in phonetics by a set of symbols mainly derived from the Latin alphabet. This set of symbols used for representing the entire inventory of sounds is known as **International Phonetic Alphabet (IPA)**. It was developed by the International Phonetic Association for a standardized representation of all sounds of oral language. The letters used as symbols of the IPA are written in square brackets '[']'. The letters written henceforth in square brackets are IPA symbols for the respective sound that they represent. The process of representing speech in writing by the use of IPA is known as **transcription**. Transcription can be **phonemic transcription** whereby the IPA symbols are written within slashes '/' and represent the standard orthographic representation of a word as well as **phonetic transcription** which is written within square brackets '[']' and it represents the phonetic variations of each word.

Physiology of Speech Production

The organs or parts of the human body that are involved in the production of sounds are collectively called **vocal apparatus** or **vocal**

tract. The human vocal apparatus consists of the lungs, the larynx, the oral cavity and the nasal cavity. The collective mechanism of these parts leads to the production of each respective speech sound.

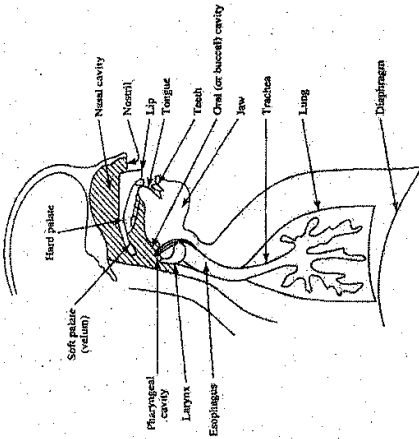


Figure 1. The human vocal tract

Lungs

The movement of air through the trachea or wind pipe which is connected to the lungs aids in the production of speech sounds.

For the production of sounds of most languages of the world, the air is driven out of the lungs through the trachea. From the trachea the air reaches the upper region of vocal tract and gets modified in various ways according to the sound which is to be produced. Such mechanism of airstream is known as **egressive pulmonic airstream**. For example, the sounds of English language are produced through egressive pulmonic mechanism of air.

At times, the production of certain sounds is by drawing the air into the lungs. This is known as **ingressive pulmonic airstream**. This can be imagined as talking while breathing in the air. Thus the air is pulled inwards from the lungs. Ingressive sounds can also be lingual ingressive (from the tongue), velaric ingressive (from the velum) or glottalic

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ingressive (from the glottis), besides being ingressive pulmonic. In many languages, the affirmative *yaah*, *yah*, or *yes* is produced with ingressive mechanism, such dialects of English spoken in Newfoundland, Ireland and Scottish Islands.

Larynx

The larynx is commonly called the 'voice-box'. It is an organ in the neck region which is involved in breathing, production of sounds and protecting the trachea. The larynx contains a pair of muscular flaps called the **vocal cords** or **vocal folds**. The airstream passes between these vocal cords during sound production. These folds are either drawn together to impede the airstream or left open for unhindered flow.

If the vocal cords are drawn together very closely but not tightly, the air passing between them will cause regular vibrations. The sounds, thus, produced are called **voiced** sounds. The vibrations can be felt by placing the first two fingers on the Adam's apple or holding the thumb and first finger against it while making the sound *zzzzzzz*. This phenomenon in speech production is called **voicing**.

When the vocal cords are well apart, the air passing through them does not cause such vibrations. The sounds thus produced are called **voiceless sounds**. This can be verified by placing the first two fingers on the Adam's apple or holding the thumb and first finger against it while making the sound *sssss*. We can also verify the voicing while producing the words *bat* and *pat* one after the other. During the production of voiced sounds, the vocal cords undergo regular vibrations between 80 and 400 cycles per second, that is, they change from being closed to open to again closed between 80 and 400 times in a single second. The time that passes between the release of a stop (consonant) and the beginning or onset of voicing is called **voice-onset time**. It is commonly abbreviated as **VOT**.

Nasal Cavity

'Nasal' refers to nose. The organ at the back of the roof of mouth (behind the hard palate) is known as soft palate or **velum**. The velum may be raised or lowered according to the sound to be produced. When the velum is raised, it creates a blockage towards the nasal cavity

and stops the air from entering the nasal cavity. Thus, the sounds are produced by the airstream entering the oral cavity only. Such sounds are **oral sounds**. When the velum is lowered, the nasal cavity remains unhindered. Therefore, the air can pass through the nasal cavity and the oral cavity. The sounds, thus produced, are **nasal sounds**. For example, when we say the word *pit*, the velum remains raised throughout the production of the word and the air passes only through the oral cavity. Therefore, these sounds are oral sounds. Whereas, in the production of the word *mean*, the velum is lowered during the production of the sounds [m] and [n] and therefore, even the vowel in the middle is produced with the lowering of velum and allowing the air to pass freely through nasal as well as oral cavity. Thus, [m], [n] and [i] produced in this manner are called nasal sounds.

Oral Cavity

The oral cavity refers to the region of mouth. The airstream reaches the oral cavity from the larynx. It may also pass through the nasal cavity at the same if nasal sounds need to be produced. From the oral cavity, the air escapes outside when the mouth is opened to produce speech. The main organs in the oral cavity which help in production of sound are lips and tongue. The tongue moves to different points or regions in the oral cavity which participate in the production of sounds, such as teeth, alveolar ridge, hard palate, soft palate, etc.

Consonants and Vowels

There are two main types of sounds in the speech of any human language: consonants and vowels. When the flow of air moving from the lungs to be expelled from the oral cavity is obstructed during articulation the sound thus produced is called a **consonant**. The vocal tract gets constricted during the articulation of consonants. For example, the English sounds [p], [b], [k], [g], etc. are consonants.

When the sound is articulated without the obstruction of the air passage in any way, and the air escapes from the oral cavity unhindered, such a sound is called a **vowel**. For example, the English sounds such as [a], [i], [o], etc. are vowels. Vowels are the most resonant sounds, that is, they re-echo the most. Certain consonants like [p] or [t] are less or negligibly

resonant whereas certain others such as [n] or [l] are considerably resonant, though not as much as vowels. Thus, vowels are the most sonorous (resounding) sounds, or they have the maximum sonority. A list of consonants and vowels (pure vowels and diphthongs) is given below.

Consonants

/p/	→	pea, pet, pole
/b/	→	boat, bell, bar
/t/	→	ten, tell, tea
/d/	→	dog, doctor, door
/k/	→	car, kettle, character
/g/	→	go, gold, get
/f/	→	fly, feather, fun
/v/	→	video, van, vine
/θ/	→	think, thunder, throw
/ð/	→	this, that, them
/s/	→	see, sell, soap
/z/	→	zoo, zebra, zone
/ʃ/	→	shall, shoe, shame
/ʒ/	→	vision, measure, television
/h/	→	hat, hello, hair
/tʃ/	→	chain, cheese
/dʒ/	→	june, jet, joker
/m/	→	man, more, make
/n/	→	now, new, never
/ŋ/	→	sing, song, thing
/l/	→	love, labour, lost
/r/	→	red, rose, rope
/j/	→	yes, yellow, yesterday
/w/	→	wet, watch, well

Pure Vowels

/i:/	→	sheep, reap, deep
/ɪ/	→	ship, sit, fit
/u:/	→	good, full, foot
/ʊ/	→	shoot, pool, cool
/e/	→	bed, ten, pen
/ə/	→	teacher, feather, about
/ɜ:/	→	bird, curd, dirty
/ɔ:/	→	saw, flaw, call
/æ/	→	cat, fat, rat
/ʌ/	→	cup, bus, much
/ɑ:/	→	far, car, father
/ɒ/	→	got, fought, on

Diphthongs

/ɪə/	here, fear, near
/eɪ/	wait, straight, late
/ʊə/	pure, sure, cure
/ɔɪ/	boy, toy, joy
/eʊ/	show, slow, go
/eə/	hair, bare, care
/aɪ/	my, fly, die
/aʊ/	cow, bow, now

Articulators

In phonetic terms, the process of 'production' of sounds is known as articulation. The organs which participate in the production of sounds are known as articulators. The articulators that move or are moved while producing a sound are known as active articulators. Generally, for production of most sounds, the tongue is the active articulator. The organs which remain stationary during the production of sounds are known as passive articulators. The various regions or points in the oral

cavity which are the passive articulators are teeth, alveolar ridge, hard palate, etc.

The different types of consonants available in different languages of the world are categorized into two classes: one is based on the place or region in the oral cavity at which there is obstruction of air flow during articulation (known as **place of articulation**) and other is the way in which the outgoing airstream is released during the articulation of consonants (known as **manner of articulation**).

Places of Articulation

Labial

The sounds which are articulated with the help of the lips are called labial sounds. If the sounds are articulated with the upper and lower lips, such sounds are called **bilabial** sounds. The English sounds [b] as in the word *bad* or [p] as in the word *pen* or [m] as in the word *man* are all examples of bilabial sounds.

Labiodental

When the sounds are articulated with the lower lip and the upper teeth as the articulators, such sounds are called **labiodental** sounds. The English sounds [f] as in the word *fan* or the sound [v] as in the word *vase* are labiodental sounds produced when the lower lip comes in contact with the upper teeth.

Dental

The sounds which are articulated when the tongue and teeth come in contact for articulation are called dental sounds. When the articulation of sound is due to the tip of the tongue touching the upper teeth, such sounds are called **dental** sounds. In English, the sounds [θ] as in the initial sound of the word *thing* and [ð] as in the initial sound of the word *those*. There are some dialects in English wherein the tip of the tongue protrudes between the upper and lower teeth instead of only touching the upper teeth. Such sounds are called **interdental** consonants. The dental [θ] and [ð] in British English may become interdental sounds in American English in words such as *thin* and *then* respectively.

Alveolar

The sounds that are articulated when the tip of the tongue (or sometimes, the blade of the tongue) touches the alveolar ridge are called alveolar sounds. Alveolar ridge is located on the roof of the mouth behind the upper teeth, before the hard palate. It is also called the gum ridge. For example, the initial sound [t] as in the English word *table*, [d] as in *dog*, [s] as in *sit*, [z] as in *zebra*, [n] as in *nose* and [l] as in *lamb* are all alveolar sounds.

Alveo-palatal/Palato-alveolar

The sounds articulated when the tip and blade of the tongue is closer to the alveolar ridge and the front of the tongue is also raised towards the hard palate, are called alveo-palatal or palato-alveolar sounds. In English, the examples of alveo-palatal sounds are the initial sound [ʃ] as in the word *ship* and the sound [ʒ] in the middle of the word *pleasure*, [tʃ] as in the word *chair*, and [dʒ] as in the word *jet*.

Retroflex

The sounds articulated when the tongue is either concave-shaped or curled backwards during articulation are called retroflex sounds. In English [ɹ] as in *red* is a post-alveolar, retroflex sound because it is articulated behind the alveolar ridge with a distinct shape of the tongue.

Palatal

The sounds that are articulated when the tongue makes contact with the hard palate on the roof of the mouth are called **palatal** sounds. Palate is the hard region between the alveolar ridge and the soft palate (or velum). For example, the English sound [j] as in the beginning of the word *yes* is a palatal sound.

Velar

When the back of the tongue touches the soft palate or the velum, the sounds thus articulated are called **velar** sounds. The English language contains many velar sounds. For example, the initial sounds [k] and [g] in the words *keep* and *go* respectively. The final sound [ŋ] in the word *ring* is also a velar sound. The initial sound [w] in the English word *witch* is a labio-velar sound involving the movement of lips along with velar articulation.

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Glottal

The sounds that are articulated with the glottis being constricted (or narrowed) are called **glottal** sounds. The English sound [h] in the beginning of words such *hit*, *house*, *heat* is a glottal sound.

Manners of Articulation

Stop

When the airstream is completely blocked behind the articulators, it creates pressure behind the articulators and then releases with an audible burst when articulators draw apart. Such a sound is called a **stop** or **plosive** or **occlusive** – ‘stop’ because the flow of air is stopped behind the closed articulators, ‘occlusive’ because the airflow remains trapped behind articulators building pressure and ‘plosive’ because the airflow releases with a burst.

In English language, the sound [p] as in the beginning of the word *pen* is articulated when the airflow is completely blocked behind the articulators (upper and lower lips) when they come in contact. The airstream remains pent-up behind articulators until it is released with a burst when the articulators move apart. In the articulation of the bilabial sound [b], this process is accompanied by vibrations in the vocal cords, as [b] is a voiced consonant whereas [p] is a voiceless consonant. As discussed earlier, the period of time between the release of the plosive and the beginning of vibration of vocal cords is called voice onset time (VOT). When the VOT is considerably long, the release of the plosive consonant is followed by a puff of air. This is called **aspiration**. The sounds articulated in this way are called aspirated sounds. Aspiration is denoted by a raised [h] after the consonant being aspirated – such as *h* – for example, [p^h].

Nasal

As discussed earlier, when the velum is lowered it allows the airstream to freely pass through the nasal cavity along with the oral cavity. This results in the articulation of **nasal** sounds. Like stops, nasal consonants too are produced by complete blockage of air behind the articulators, but allow the air to pass through the nasal as well oral cavity during release. For example, the English consonant [m] as in the word *man*,

is articulated with complete closure of airflow behind the lips followed by lowering of velum and the sudden release of air through oral as well as nasal cavity. All the nasal consonants occurring in the phonemic inventory of English language are voiced.

Fricative

The articulation of a **fricative** consonant takes place when there is incomplete closure of air behind the articulators. This leaves a narrow passage open and the airstream is forced out through it, creating turbulence or noisy sound. This release of turbulent airflow is called friction. The English language has voiced as well as voiceless fricatives. For example, labiodental fricatives [f] as in *fool* and [v] as in *vase*, dental fricatives [θ] as in *thing* and [ð] as in *those*, alveolar fricatives [s] as in *sun* and [z] as in *zone*, post-alveolar fricatives [ʃ] as in *shoe* and [ʒ] as in the middle of the word *treasure*, glottal fricative [h] as in the word *hat*.

Affricate

The sounds articulated by the combination of a plosive and a fricative are called **affricates**. This means that affricates begin as a stop and release as a fricative. English language has two affricates, the voiceless affricate [tʃ] as in the initial sound of the word *church* and the voiced affricate [dʒ] as in the initial sound of the word *judge*.

Lateral

When the tongue blocks the airstream to flow from the middle region and results in the passage of air releasing from the sides of the tongue, sounds articulated in this way are called **lateral** sounds. Lateral sounds can be alveolar, dental, post-alveolar or even retroflex. Lateral sounds are usually voiced. English language has the alveolar lateral [l] in its phonemic inventory as in the beginning of the word *love*.

In many English dialects, when [ɹ] occurs at the end of the word, the back of the tongue is raised during articulation. This is said to be a lateral having ‘dark’ quality or ‘dark l’. In IPA it is represented as [ɫ]. For example, in the English words *ball* or *cool*.

Rhotic

The r-like sounds are **rhotic** sounds. They are represented in the IPA by using different variants of the Latin letter r. These are liquid

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consonants. In British English there are many varieties of /r/. But the most common variety among them is described as the **post alveolar frictionless continuant**. When the tip of the tongue is brought close to the back of the alveolar ridge and the rims of the tongue touch the sides of the upper teeth and the air stream comes out through the gap between the tongue and the alveolar part of the mouth without friction, we have the articulation of the post alveolar frictionless continuant in British English.

Glide

The consonants which have least constriction at the point of articulation are called **glides**. They are also called **semi-vowels** as they are the most vowel-like consonants – experiencing lowest obstruction of air flow during articulation. During the production of glides, one articulator (active articulator) moves or travels towards the other (passive articulator) but does not reach each other. English language comprises of the glides [j] and [w] in its phonemic inventory.

The consonant [j] in English is found at the onset of the words like *yet* [jet] or *you* [ju:]. During the articulation of [j] the blade of the tongue (active articulator) moves towards the palate (passive articulator), but does not make complete contact (or makes an approximate contact, thus, resulting in least constriction). Therefore, it is a palatal approximant (glide).

The consonant [w] occurs in English words such as *wait* [weɪt]. The articulation of [w] involves the back of the tongue moving towards the velum and the rounding of the lips at the same time. Though the articulators come close to each other, they do not make complete contact. This labio-velar glide occurs in about 85% of the world's languages.

Thus, the consonants in the phonemic inventory of English language are classified on the basis of three features – **voicing**, **place of articulation** and **manner of articulation**. For example, the difference between [p] and [b] can be identified by these three features as – [p]: voiceless, bilabial, plosive; and [b]: voiced, bilabial, plosive. The consonants in English language can be depicted through the IPA chart as follows (Figure 2):

Manner of Articulation	Places of Articulation							
	Bilabial	Labio-dental	Inter-dental	Alveolar	Alveo-palatal	Palatal	Velar	Glottal
Stop	p, b	f, v	θ, ð	t, d	tʃ, dʒ	k, g	ʔ	
Fricative				s, z	ʃ, ʒ		h	
Affricate					tʃ, dʒ			
Nasal								
Lateral								
Approximant								
Retroflex								
Approximant								
Glide	w							
State of the Glottis	Voiced							Voiceless

Figure 2. IPA Chart of Consonants in English

Vowels

The speech sounds that are produced without any obstruction to the air passage in the vocal tract are called **vowels**. Hence, the air pressure is not built-up at any point above the glottis. During articulation, the airstream vibrates due to the movement of vocal cords and the vocal tract acts as the resonating chamber. Thus, vowels are usually voiced sounds in all languages. Also, they have the most resonance during production and therefore, have the highest sonority. During vowel articulation, the cavities located above the glottis are merely resonating chambers. The shape of these cavities can be modified by the different positions of the tongue and shape of the lips. This results in directing the outgoing airstream in a definite manner.

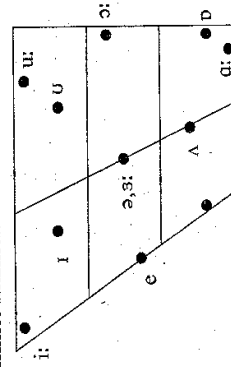


Figure 3. IPA Vowel Chart

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The vowels occurring in different languages of the world can be classified on the basis of three qualities – **tongue height** (vertical dimension), **backness** (horizontal dimension) and **rounding** (lip position). Tongue height is classified as high (close), mid and low (open). The backness feature can be verified as front, central and back. Lip rounding can be classified as rounded (round lips) and unrounded (spread lips). (Figure 3).

During the articulation of the vowel, if the tongue is raised towards the roof of the mouth (high up), it is a **high** or **raised** vowel. In IPA chart, it is referred to as **close** vowel referring to the jaw as being closed during articulation. For example, the vowel [i:] in English words such as *meet* [mi:t], *great* [gri:t], *eagle* [i:g(ə)] or the vowel [u:] in English words such as *boot* [bu:t], *good* [gu:d] and so on. When the tongue is positioned at the floor of the mouth, the vowel articulated is a **low** vowel. In IPA it is referred to as **open** vowel as the jaw is open during articulation. For example, the vowel [æ] in English words such as *cat* [kæt], *at* [æt] or the vowel [ɒ] as in the English word *cor* [kɒt] and so on. If the tongue body is positioned at a neutral height in the oral cavity, the vowels articulated are **mid** vowels. For example, the vowel [e] as in the English words *bed* [bed], *get* [get] or the vowel [ə] (pronounced as 'uh') in words such as *woman* [wʊmən] and so on.

When the articulation of vowel is with the tongue positioned relatively towards the front of the mouth, it is a **front** vowel. The following vowels in English are front vowels:

[i:] as in *meet* [mi:t]; [ɪ] as in *bit* [bɪt];
[e] as in *bed* [bed]; [æ] as in *cat* [kæt].

When the tongue is positioned relatively towards the back of the oral cavity, the vowel thus articulated is a **back** vowel. The following vowels in English are back vowels:

[u:] as in *food* [fu:d]; [ʊ] as in *put* [pʊt];
[ʌ] as in *cut* [kʌt]; [ɔ:] as in *ought* [ɔ:t];
[ɒ] as in *cor* [kɒt]; [ɑ:] as in *bath* [bɑ:θ].

When the tongue is positioned at the central region of the mouth, the articulated vowel is a **central** vowel. The examples of central vowels in English are as follows:

[ə] as in *ago* [əgəʊ]; [ɜ:] as in *bird* [bɜ:d].

The front mid vowel [e] occurs in English generally as a vowel in a diphthong (two adjacent vowels or towels together). For example, in the English word *take* [teɪk].

During the articulation of certain vowels the lips are rounded and thus are called as **rounded** vowels. When the lips are spread apart during articulation, the resulting vowels are **unrounded** vowels. The low vowels are usually articulated with the lips in neutral position. In English language, the phonemic inventory comprises of rounded vowels such as [ʊ], [ɔ] as well as unrounded vowels such as [i], [ɒ], [æ] and so on.

Phoneme and Allophone

The minimal distinctive unit of speech in a language is called **phoneme**. Phoneme is an independent speech sound occurring in the phonemic inventory of a language and it contrasts with other sounds of the language. This means that if one phoneme is replaced by another phoneme, it would bring about change in the meaning of the word to which the change has been made. For example, English has the phonemes [p] and [b] in its phonemic inventory. If the phoneme [p] in the word *pin* is replaced by [b], the word changes to *bin*, therefore, changing the meaning of the word. To identify whether two sounds in a language are phonemes, one must look for their **minimal pairs**. Minimal pair consists of two words which are identical except for a single phoneme at a particular position. Thus, the aforementioned words *pin* and *bin* are minimal pairs because except for the plosives they have identical structure.

The alternative phonetic realizations of the same phoneme are known as **allophones**. This means that various ways in which speakers of a language articulate the same sound are called allophones. For example, the native speakers of English articulate the phoneme [p] in at least three different ways. In the word *pen* [p'en], it is articulated as aspirated consonant [p^h]. In the word *skip* [skɪp], it is articulated as unreleased consonant [p̚]; whereas, in the word *spin* [spɪn], it is articulated as [p]. Thus, the phoneme [p] is also articulated as [p^h], [p̚] and [p]. Hence, [p^h], [p̚] and [p] are the allophones of the phoneme [p]. Moreover,

replacing a phoneme by its allophone or an allophone by another allophone of the same phoneme does not bring about any change in the meaning of the word. For example, whether an English speaker says [pen] or [pʰɛn], there is no change in the meaning of the word.

Prosodies

Certain phonetic properties or features are spread over the sequences of sounds and not just an individual phone. These properties are referred to as **prosodies** (sing. prosody) or **suprasegmentals** (sing. suprasegmental). Prosodies include pitch, stress, loudness, tempo, length and rhythm. Of these, pitch and stress have been discussed below.

Pitch

The frequency of vibration of the vocal folds is referred to as **pitch**. The pitch varies from moment to moment when we speak.

Intonation

When the pitch varies (rises or falls) in definite structured ways with each distinct utterance to convey different modulations of the meaning that is conveyed by the words in the utterance, it is referred to as **intonation**. Every utterance is produced with some intonation pattern by each speaker of the language. The intonation patterns vary with individual accents as well as the language being used. It is common for speakers to use rising intonation while uttering a question. Thus, intonation patterns indicate the varying attitudes of the speaker while making the utterance, suggest difference between statements and questions, express emotions as well as draw attention of the hearer to the important elements of the utterance.

In English, the intonation patterns occur on whole groups of words. Such groups are known as **tone groups**. It is better to divide a longer utterance into smaller tone groups for convenience of pronunciation.

Tone groups may consist of a single word or multiple words. A tone group is basically a stretch of speech between two pauses. Division into tone groups depends on following three considerations:

1. Grammatical considerations: A long phrase or a clause is generally pronounced as a tone group as in the following examples:

||One of my friends from Nashik|| has won a lottery. ||
 ||When they saw the thieves|| the dogs started barking. ||

2. Consideration of punctuation: Clues of punctuation often help us determine the tone boundaries. Thus full stop, colon, semicolon and sometimes, comma will signify the end of the tone group as in the following examples:

||I think I know all about TajMahal. ||although I have never actually seen it. ||

||On Saturday, || they will leave for Delhi. ||

3. Semantic considerations: Very often we have to divide the utterance according to the distribution of meaning and hence semantic clues are also important, as in the following:

||There is a well-known city in Kashmir|| called Srinagar. ||I had an opportunity to go there|| as a part of a delegation. ||

The most important element in a tone group is called a **nuclear/tonic syllable**. It is a syllable on which there is a change in the pitch of voice. The tonic syllable signifying the change in the tone (i.e., a fall or rise or fall-rise) is generally the last accented syllable in the tone group and it is called **end-placed nucleus**. For example, || I think he is 'right. || However, a non-final syllable can also be made the nucleus if the speaker wishes to convey a special emphasis or contrast. For example, || I 'think 'he is 'right. || This kind of nucleus is called **contrastive nucleus**.

Tone groups not only provide distinction between the basic units of writing (which is a sentence) and speech (which is a tone group), but also depict the cognitive basis, the need to think. When the speaker is producing one tone group, he or she is simultaneously planning the next tone group. Thus, one tone group reflects a single thought or message at a time. Hence, the number of tone groups into which an utterance is divided and the message conveyed by each reflects the speaker's perceptions and ideas. The pauses taken by the speaker while planning the following tone group, often marked by false starts or disfluencies such as *umm, err, uh/hh*, are referred to as **voiced hesitations**.

At times, the way an utterance is divided into tone groups largely influence the meaning conveyed by the utterance. For example, consider the following utterance which can be divided in two types of tone groups:

(123)

The student said the teacher is very lethargic.

- The student said || the teacher is very lethargic ||
- The student || said the teacher || is very lethargic ||

Hence, there can be completely contradictory meanings that are conveyed by the two different distributions of the tone groups of the given utterance.

The main intonation patterns in English are the falling tone, the rising tone and the falling-rising tone.

Falling Tone

A falling tone is marked by the symbol / ˈ / in front of the stressed syllable where the change in pitch begins. It is used in making ordinary statements as in the sentences below.

We're late for 'office.
The child is 'hungry.
Mother is sending an 'email.
I live in an a'partment.
It's six o' 'clock.
The sea is rough to 'day.

The falling tone is also used in commands and in wh-questions (beginning with the words 'what', 'why', 'where', 'when', 'which' and 'how') uttered in an emotionally neutral/casual manner. For examples of this, look at the sentences below.

Open the 'door.
Stop the 'car.
Give her the 'money.
What is your 'name?
Why did you 'leave?
Where is the 'spoon?
When will Nikhil re'turn?
Which book did she 'choose?
How is the 'patient?

Question tags take a falling tone when they are used to seek agreement. You are my friend, 'aren't you? (The speaker is sure of what she is saying.)

Rising Tone

A rising tone is marked by the symbol / ˊ / in front of the stressed syllable where the change in pitch begins. It is used firstly in questions which seek a Yes/No answer.

Is the water 'cool?
Are you 'coming?
Was the film 'good?
Do they speak 'Telugu?
Has she bought a 'car?
Will you water the 'plants?

(Note that the rising tone is sometimes used in interrogative sentences with question words like 'how' and 'what'. This is done to convey a sense of warmth or friendliness as, for example, in 'What's the matter?')

The rising tone is also used to make polite requests.

Could you ex'plain this, please.
Please come to the 'party.
Would you drop me 'home.

Question tags take a rising tone when used to seek confirmation.

The man has left, 'hasn't he? (The speaker is not sure he is right.)

Finally, the rising tone is used to convey sarcasm.

The man is 'powerful. (and, for example, can do as he pleases)
The earth is ours to 'pollute. (when it is not really so)

Falling-rising Tone

A falling-rising tone is marked by the symbol / ˊ ˈ / placed in front of the stressed syllable(s) concerned. It is used to convey more than the literal meaning of the sentence and these implied meanings are the speaker's attitudes such as doubt, sarcasm, reassurance and apology.

The situation is not com'pletely bad. (reassuring)
 The cook can surely make us a cup of 'coffee. (sarcastic)
 You can 'manage. (doubtful)
 Although we lost the order, I 'did try hard. (apologetic)

Stress

Each syllable in speech may be produced with different levels of lung energy or forcefulness. There are simultaneous differences in the tension experience by the vocal cords. When the energy is high, the pitch, loudness and intensity of articulation of the syllable are also high. The syllables thus produced with high energy are **stressed** syllables. In the IPA, stress is represented by the diacritic mark ' before the syllable carrying the stress. The occurrence of stress may influence the syllable phonologically. In English, generally the vowel in the unstressed syllable is a schwa [ə]. Also, in English language the stress can be on any syllable. For example, on the first syllable in the word *photograph* ['fəʊ.tə.ɡrɑ:f], on the second syllable in the word *establish* [ɪ.'stæb.lɪʃ] or on the third syllable in the word *disagree* [dɪs.ə.'ɡri:]. For homonyms belonging to separate word categories, the stress identifies the grammatical class to which a word belongs. For example, the word *protest*. When it is to be used as a noun, the stress is on the first syllable ['prəʊ.test] and on the second syllable when it is to be used as a verb [prə.'test]. One can also notice that as the verb *protest* does not receive stress in the first syllable, and the vowel in the first syllable is a schwa.

Stress in Disyllabic Words

The first problem that a learner of English faces is the seemingly irregular ways in which the syllables are stressed in words with two or more than two syllables. It is often difficult to say which syllable is the loudest, or which receives the primary stress. Some disyllabic words such as *'single*, *'mother* and *'heaven*, are stressed on the first syllable, while other disyllabic words such as *d'gain*, *r'mark* and *h'o'tel*, have the main stress on the second syllable. Look at the following examples of how disyllabic words are stressed.

Stress on the first syllable

'Eng.lish	'a.ble	'doc.tor	'bag.gage	'pri.vate	'cap.tain
'la.zy	'dam.age	'pa.tient	'ea.ger	'bis.cuit	'ac.tor
'ad.verb	'an.gry	'car.ton	'cei.ling	'da.ta	'de.cent
'en.gine	'fro.zen	'gath.er	'har.vest	'i.tem	'jack.et
'jeal.ous	'kid.ney	'la.bour	'lim.it	'man.y	'mar.ket
'na.tion	'neigh.bour	'o.pen	'o.ral	'ped.al	'pep.per
'quar.rel	'rain.y	'scrib.ble	'trol.ley		

Stress in Polysyllabic Words

Stress in words having more than two syllables varies considerably. There are trisyllabic words like *'per.ma.nent*, *'re.gi.ster*, *'in.ter.val*, which are stressed on the first syllable, but in other trisyllabic words like *per.'mi.sion*, *re.'flec.tion*, *de.'ve lop*, stress is placed on the second syllable and in words like *ci.'ga.r'ette*, *di.'sa.'ppoint* and *un.'der.'stand*, stress is placed on the third syllable. In polysyllabic words with prefixes and suffixes, the stem part of the word, which is more important from the point of view of meaning, is always stressed, while prefixes and suffixes are generally not. However, each word should be treated independently.

oc.'ca.sion	dis.con.'nect
re.'ac.tor	fa.'mi.liar
im.'pos.si.ble	dis.em.'bark
sul.'phur.ic	des.'crib.ing
in.'fla.tion	un.'kind
fi.'nan.cial	in.ex.'pe.ri.nced
pro.'duc.tion	in.sin.'cere
de.'pen.dent	if.'fo.gi.cal

Stress Shift in Derived Words

Another difficulty faced by the non-native speaker of English has to do with the change in the stressed syllables of derived words. Some typical examples are given below.

There are of course some exceptions to such shifts in stress, for example *con'clude*, *con'clusive*, *con'clusion* where the derived words are stressed on the same syllable as the main word.

'demo'cratic (primary stress on the first syllable)
de'mo'cracy (primary stress on the second syllable)
demo'cratic (primary stress on the third syllable)
'demon'strate (primary stress on the first syllable)
de'monstrative (primary stress on the second syllable)
demon'stration (primary stress on the third syllable)
'photo'graph (primary stress on the first syllable)
pho'tographer (primary stress on the second syllable)
photo'graphic (primary stress on the third syllable)

Stress Shift According to Function

Another aspect of English word stress is the shift in stress in a number of disyllabic words, depending on whether the words are used as nouns, as adjectives or as verbs. Usually, nouns or adjectives are stressed on the first syllable, and when the same words are used as verbs, the stress falls on the second syllable. There are also some exceptions to this rule for not all disyllabic nouns and verbs undergo such a shift in the stressed syllable. For example, in words like *or.der*, *re'form*, *vi'sit* and *ad.vance*, the primary stress is on the same syllable whether they are used as nouns or as verbs.

noun/adjective	verb
'desert	de'sert
'survey	sur'vey
'permit	per'mit
'present	pre'sent
'perfect	per'fect
'object	ob'ject
'export	ex'port
'import	im'port
'rebel	re'bel

Stress in Compound Words

In a compound word, consisting of a combination of two words, the primary stress is generally on one word—usually the first. Sometimes both the words are stressed, but then the primary stress is on the second word.

primary stress on the first syllable	primary stress on the second syllable
'black.board	part.'time
'rain.coat	short.'lived
'rail.way	four.'footed
'stone.age	down.'hearted
'motor.car	open.'minded
'green.house	middle.'class
'book.shelf	loud.'speaker

Sentence Stress

Not all the words in a sentence are stressed. Content words, which are vital to meaning, such as nouns, verbs, adjectives, adverbs, interrogative pronouns and the negative 'not' generally receive the stress while pronouns and grammatical words like helping verbs, prepositions, articles and conjunctions are not stressed. This is because they are not important for the meaning of sentences. Let us take a few sentences and mark the words that stand out from the rest.

He has 'gone.
I 'met him in the 'morning.
It's an 'hour's 'journey from 'here.
I 'like 'studying 'English.
He 'lost his 'keys in the 'bus.
'This is the 'car that 'Shailesh 'bought.
'Did you 'meet my 'friend 'John?
I shall 'see you 'later.
'Where does he 'live?
I 'usually 'watch T. 'V. before 'going to 'bed.

Weak and Strong Forms

The words which do not take stress are considered weakened and therefore are called **weak forms**. Generally, they are the grammatical words of a language – that is, the words which perform grammatical function in a sentence but do not carry any meaning. The words in English language which belong to this category are articles, prepositions, conjunctions, auxiliary verbs, etc. These are also known as the closed category of words – that is, the category wherein new words cannot be added – they occur in a sentence only to provide grammatical information. When the words are produced with stress, such forms are called **strong forms**. Stress is received by a word either when it is produced in isolation or for deliberate emphasis. Monosyllabic words containing a schwa as the syllabic nucleus are also weak forms in the utterance in which they are used. For example, the word *but* articulated as [bʌt] is a weak form. Moreover, contracted or clipped forms of words do not carry stress and therefore, are weak forms. For example,

I have done the work → I've done the work.

Here, the contracted form 've of the verb *have* is a weak form.

Connected Speech

When any language is written, each word occurs as an orthographically independent unit. There are clear-cut boundaries between the words in the written form, therefore, making it easier to comprehend each word. However, in speech, it is a continuous stream of sounds. There are no overt pauses or any other means through which a listener can distinctly identify the end of one word and the beginning of other. Speakers generally tend to articulate their speech with maximal economy rather than maximal clarity. Therefore, certain sounds get merged or linked while speaking. The articulators keep rapidly moving from one state to the other or are in constant transition during speech – they are not steady at a particular place in the oral cavity. At times, certain words also get merged in speech. Native speakers of any language comprehend what is being spoken by assuming the words with reference to the context in which they are spoken. Non-native speakers may not be able to predict words in this fashion as they may not have a vast

repertoire of syntactic (grammatical) and lexical (vocabulary) items and only depend upon each sound being articulated to identify the word spoken. Thus, **connected speech** can be termed as the ordinary spontaneous speech of speakers of a particular language – which is not articulated as individual sounds or words in isolation. For example, one can produce the words *last* and *person* individually. The words will be articulated as [lɑ:st] 'last' and [pɜ:sn(ə)n] 'person'. Now, if the same words are spoken together spontaneously, what one hears is sounds like 'lastperson' [lɑ:spɜ:sn(ə)n]. The consonant [t] at the end of the word *last* gets omitted in speech. The reason for this is that it is difficult for an English speaker to articulate three consonants together in a row, where two consecutive consonants are plosives. Therefore, the consonant that requires the maximum adjustment of articulators or is 'difficult' to articulate in the combination, is dropped by the speakers. This is what we mean by observing maximal economy while producing speech. Hence, in speech, the sounds are influenced by other sounds occurring in their environment. Thus, the pronunciation of words when produced in isolation or independently would be different than when they are produced as connected speech. The changes taking place in sounds due to their occurrence in a particular environment can be in the following ways:

1. Resyllabification

For two consecutive words, if the first word ends in a consonant and the next word begins with a vowel, the consonant is produced as the beginning sound of the next word. This means that the consonant which initially belonged to the syllable of the first word shifts to the syllable of the next word (resyllabification). For example, the phrase *back out* consists of two words *back* [bæk] and *out* [aʊt]; where the first word ends in a consonant [k] and the next begins with a vowel [a]. Whereas when the words are spoken together, they are produced as [bæk.aʊt]. The consonant [k] moves to the beginning of the next word.

2. Gemination

If there are two words produced together, where the last sound of the first word and the sound at the beginning of the next word are the same, the repeated consonant is articulated longer. For example, when we say the *big girls* together, the sound [g] gets lengthened.

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3. Elision (or Deletion)

When a sound gets deleted from a word in speech, it is known as elision. This happens as the respective sound does not carry the stress in the word. For example, the English words *family*, *chocolate*, *different*, *several* are produced as *fam'li* [famli], *choc'late* [tʃɒklət], *diff'rent* [dɪfr(ə)nt], *sev'ral* [sevɪ(ə)] respectively.

4. Assimilation

When a speech sound gets changed to become more similar to its neighboring sound, it is known as assimilation. For example, when we say *one book* together, the dental nasal [n] at the end of the word *one* changes to bilabial nasal [m] because the next word *book* begins with a bilabial sound [b]. That is, [wʌnbʊk] changes to [wʌmbʊk]. Thus the nasal sound becomes more like the following plosive.

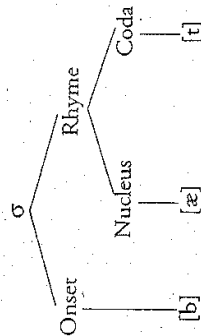
5. Palatalization

When the first word ends in a consonant and is followed by a palatal sound as the beginning of the next word, the terminating sound of the first word becomes a palatalized sound. For example, if the two words spoken together are *this year* – here, the first word ends in an alveolar [s] and the next begins with a palatal [j]. These words when produced together, the [s] is articulated as [sʲ]. This means that [ðɪsjə] is articulated as [ðɪsʲə].

Syllable Structure

The phonological unit or 'block' which depicts the organization of speech sounds in a word is known as **syllable**. Syllable is represented as σ in phonological notations. Syllables in a word can influence the prosody, stress, rhythm, meter of the word to which they belong. A syllable necessarily has a **syllable nucleus** which is generally the vowel. In English, the liquid [l] as well as rhotic [r] can also form the syllable nucleus depending upon their occurrence. The syllable nucleus is generally surrounded by one or more consonants. The consonant(s) which occurs before the vowel (nucleus) in a syllable is called the **onset**. The consonant(s) which occurs after the vowel in a syllable is called the **rhyme** or **rime**. Thus, the syllable structure mainly contains two parts – **onset** and **rhyme** (or **rime**). Rhyme further branches into **nucleus**

and **coda**. Nucleus is the vowel (or syllabic consonant) and coda is the consonant occurring after the vowel. Thus, for the English word *bat* [bæt], the structure of a syllable can be represented as:



This syllable structure can also be represented as CVC (where, C = Consonant, V = Vowel). In transcription, syllable boundaries are represented by a dot '·'.

The words which consist of only one syllable are called **monosyllabic** – such as *bat*. The words which consist of two syllables are called **bisyllabic** or **disyllabic** – such as *lovely* [lʌv.li]. The words consisting of three syllables are called **trisyllabic** – such as *beautiful* [bjʊ.tɪ.fʊl]. Similarly, words consisting of more than three syllables are called **polysyllabic** – such as *discrepancy* [dɪs.kre.p(ə)n.sɪ].

Thus, the study and understanding of phonetics and phonology enables a speaker to identify and articulate the speech sounds and also helps them understand the cognitive basis in their native language as well as in acquiring and learning a second language.

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