MODULE 2 PHONETICS

UNIT 1 PHONETICS AND ITS BRANCHES

CONTENTS

1.0 INTRODUCTION

In this unit, you will be introduced to the meaning of, and the procedure for studying phonetics. You will also be exposed to the different branches of phonetics, how they differ from each other as well as what they share in common.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- do phonetic analysis;
- identify the different branches of the subject; and
- analyse how the branches relate to each other.

3.0 MAIN CONTENT

3.1 Phonetics: Meaning and Procedure

In Module 1, you were introduced briefly to the study of phonetics. Phonetics is the scientific study of human speech sounds. The study provides methods for the identification, description, classification, and transcription of human speech sounds.

Definitions of Phonetics
1) Identification of human sounds
2) Description of human sounds
3) Classification of human sounds
4) Transcription of human sounds

3.2 Phonetics: Branches

3.2.1 Phonetics: Articulatory

Articulatory phonetics refers to the approach to the phonetic medium that seeks to explain and classify speech sounds in terms of the variations in the production of the speech sounds.

It is about the most highly developed and longest established branch of phonetics. It sees speech as an activity of the speaker and concentrates attention on the human speech organs and how these organs function singly and in combination with each other to modify exhaled air from the lungs into speech sounds.

In articulatory phonetics, speech sounds are described in terms of the organs which produce them and how these organs behave during their production. For instance a description of the sound [p] will include the fact that the two lips come together and momentarily completely block the passage of air from the lungs and then a sudden release of the air or a sudden parting of the lips occurs resulting in some kind of explosion. It is for this reason that the phonetic description of [p] includes the terms “bilabial plosive”. In this course, we are mainly concerned with this aspect of phonetics – Articulatory Phonetics. Unit 5 of this Module provides essential information on the organs of speech.

3.2.2 Phonetics: Auditory

This branch of phonetics sees speech mainly as an activity of the hearer: how the hearer perceives and interprets speech sounds. This branch of phonetics is also sometime said to be perceptual. In addition to being concerned with the basic sounds of natural languages, it deals with such

properties of sounds as pitch, accentuation and loudness – non segmental issues which affect sound perception.

Generally, the hearer does not listen to a sound for its own sake; he listens in order to get meaning. This means that he listens for sounds in association with other sounds. As you become mature in your phonetic training, you will be able to listen to sounds analytically – listening in order to appreciate specific sound features. The person who has not received phonetic training should, other things beings equal, be different from you. He would be one capable of listening naturally – more concerned with meaning than with the sound features which produce the meanings.

SELF-ASSESSMENT EXERCISE

i. Why is auditory phonetics sometimes said to be perceptual?
ii. Distinguish between listening analytically and listening naturally.

3.2.3 Phonetics: Acoustic

This branch of phonetics concentrates attention on studying the physical properties of the sound waves generated when the speech organs go into activity. It also seeks to explain how sound is transmitted through the air from the speaker to the hearer. Recently this branch has made a lot of progress and has helped to clarify a lot of information relating to articulatory phonetics. Acoustic phonetics has emphasised the fact that speech is a continuous flow of speech sounds. It utilises machines such as the Spectrograph and the Oscillomink to measure sound waves particularly the frequency and the amplitude of sound wave. Engineers, builders and construction experts frequently make use of acoustic information. For the purpose of ensuring accuracy of information, machines and other instruments used for acoustic measurement must be properly maintained by qualified engineers. Laboratory instruments which are well maintained will hardly ever have "bad days." i.e. days during which they break down or produce wrong information.

3.2.4 Relationship of the Branches

The different branches of phonetics may be taken to represent separable approaches to the study of the subject. Any of the approaches may be adopted because of the investigator's purpose or convenience. For instance, an architect who has to design a sound – proof studio, theatre or auditorium would find acoustics very useful. A big hall, in which people find difficulty in hearing an address from a central position, may be said to have poor acoustics. A well constructed language laboratory is normally said to possess good acoustics. On the other hand a linguists,

particularly an expert in general phonetics and the phonology of a particular language, finds articulatory phonetics – the realisation of sounds of natural languages – very important. Equally, such an expert finds auditory phonetics – the perceptual aspect of sounds – very relevant to his interest.

In some respects, however, the three branches are interconnected. For instance, if we pay attention to realisation (pronunciation) and perception (hearing) of the sounds [p] and [b], which are both bilabial plosives, all the three branches would be seen to be relevant: articulatory phonetics would add the dimension of vibration of the vocal lips to bring about voicing in the case of [b] and the absence of vibration of the vocal lips in the case of [p].

Auditory phonetics would supply information that differentiates voiceless [p] from voiced [b]. In a third way, the differences would feature more prominently in an acoustic analysis of the same sounds where evidence of noiselessness would be available in the sound wave for [p] and evidence of voicing would be available in the sound wave for [b].

So, while the three branches of phonetics: articulatory, auditory and acoustic are separate (and separable) all the three are, as we have seen above, also united in their functions. The three branches also underlie the study of phonology.

4.0 CONCLUSION

From this unit, we have seen that phonetics is divided into three branches – articulatory, auditory and acoustic. We have seen that each branch is important and that also the three are also interconnected. Also, they all relate to the study of phonology.

5.0 SUMMARY

In this unit, you have studied three branches of phonetics – articulatory, auditory and acoustic – and the main concern of each branch. You have also studied the branches which are the main concern of the phonetician (articulatory and the auditory) and the one which, apart from being of technical importance to the phonetician, is also of use to people in other walks of life such as architecture and building engineering. You are now adequately prepared to begin a study in which your knowledge of articulatory phonetics in particular will come in handy.

6.0 TUTOR-MARKED ASSIGNMENT

In about 2 pages of your answer paper, discuss the branches of phonetics, making certain that in your discussion you indicate how the three branches are related. Submit your answer to your tutor for assessment.

7.0 REFERENCES/FURTHER READING

Eka, D. & Inyang, U. (1996). *Aspects of Spoken Language:* Calabar, BON Universal Ltd.

Gimson, A.C. (1980). *An Introduction to the Pronunciation of English.* London: Edward Arnold.

Lyons, John (1990). *Language and Linguistics: An Introduction*. London: Cambridge University Press.

UNIT 2 SPEECH SOUNDS/PRODUCTION PROCESSES

CONTENTS

1.0 INTRODUCTION

In this unit, you are going to be exposed to speech production processes in natural languages. Before then you will revisit the nature of speech sounds. You will also be exposed to a technical matter: articulation of sounds.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the nature of speech sounds;
- isolate the focus of speech production;
- explain the main processes of speech production; and
- discuss articulation of sounds in natural languages.

3.0 MAIN CONTENT

3.1 The Nature of Speech Sounds: Revisited

One way to describe speech is to see it as a medium of transmission for language. It is the phonic substance of language, as compared to writing. That it constitutes the phonic substance presupposes that the spoken medium (as opposed to the written medium) is made up of sounds. To be more specific, we relate sounds to speech and refer to them as speech sounds.

This implies that a speaker utters sounds which combine to form syllables (syllables, if they are not of word status) are combined to form words while words are combined to form groups and longer stretches of utterances with which human beings communicate. The whole process of production and perception of speech which we are concerned with in this course is known as speech processing.

3.2 Speech Production: The Focus

Normal people speak very many times each day: to members of their families, to those in their communities and to others in the larger society. Particularly in a situation of first language acquisition, the effortless nature of the acquisition of the speaking skill makes it understandable that some speakers hardly ever ask: What is speech? How is it produced?

For those who study linguistics (particularly those whose interest is mainly in the branch called phonetics), and for those who study the way languages operate, it is important to understand what speech is and how it is produced. These are our concerns here.

3.3 Speech Production Process

3.3.1 Respiratory and Phonatory Stages

When air leaves the lungs (where it is normally stored), it moves through the trachea to the larynx which covers and encloses the vocal lips (vocal bands, vocal cords or vocal folds). At the centre of the vocal lips, there is space (the glottis). When this space is closed, the vocal lips are brought together through the action of the elastic membranes which stretch from the front to the back, across the larynx. This closure of the vocal lips naturally leads to a building up of air pressure below them. The air so built up forces itself through the vocal lips in periodic puffs. The vocal lips will then open under this pressure, first from the bottom and then upwards creating a kind of rippling action. Also, the combined effects of the forced opening and closing will results in a vibration of the vocal lips. A sound that comes with the vibration is normally voiced. Voice may, therefore, be seen as a technical term that refers to phonation – a pre articulatory output from the vibration of the vocal lips. All voiced sounds in all natural languages are produced when the vocal lips are in a closed position – a position that prepares the way for vibration.

But the vocal lips do not always remain in a closed position: sometimes they are partially open and at other times they may be fully open. When they are partially open, the air that passes through them results in

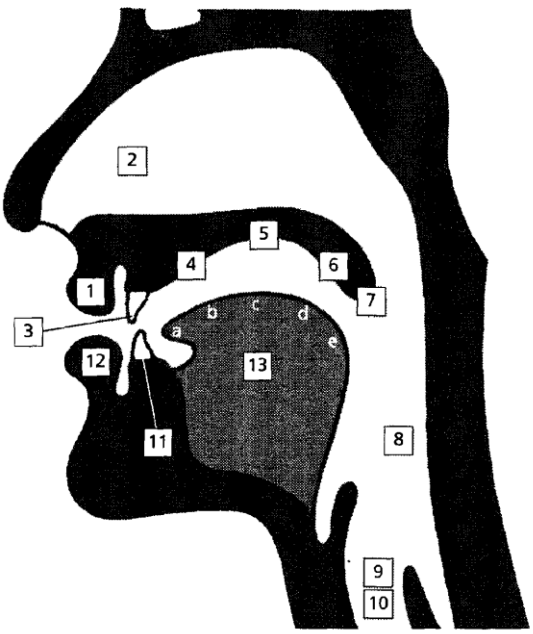
whisper. When they are fully open, air passes through them without vibration and that result in the ensuing sounds being voiceless. Thus, the vocal lips help us to distinguish between voiced and voiceless sounds and when they assume a posture of intermediate opening, they help us to identify whisper. Perhaps more importantly, the vocal lips help us to distinguish between vowels and consonants: in the realisation of vowels, in practically all natural languages, there is a vibration of the vocal lips. This follows the fact that all vowels in all natural languages are normally voiced. On the contrary, consonant sounds in all natural languages are either voiced or voiceless. These statements do not exclude the issue of devoicing which is possible in all cases.

3.3.2 Articulatory Stages

From the vocal lips, the air passes through the pharynx. At this point, the brain carries out a quick, sharp action, directing the soft palate (also called the velum) particularly the uvula (the pendulous end of the velum), on what to do: the uvula will either be lowered to block the oral cavity or raised to the back wall of the throat to block the nasal cavity.

The blocking of the oral cavity takes place when nasal or nasalised sounds are to be realised. The blocking of the nasal cavity takes place when oral sounds are to be produced. It should however, be noted that in practice any sounds can be nasalised to demonstrate organ control although speech defect can also lead to it.

The entire production process can be seen at a glance in Figure 4 below:



1 Upper lip
2 Nasal cavity
3 Upper teeth
4 Alveolar ridge
5 Hard palate
6 Soft palate
7 Uvula
8 Pharynx
9 Glottis
10 Larynx
11 Lower teeth
12 Lower lip
13 Tongue
a tip
b blade
c front
d centre
e back

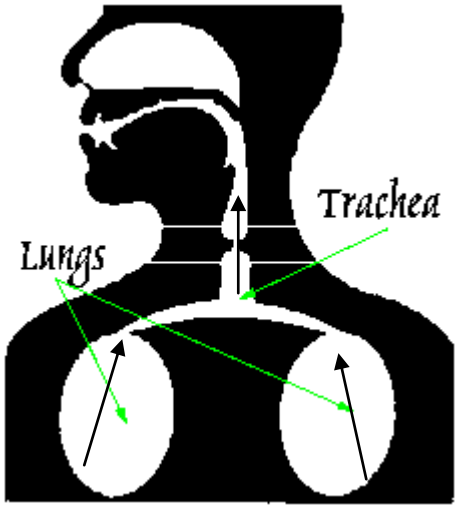


Figure 4b: Arrows Showing Airstream from the Lungs to the Trachea

Figure 4. Diagram Showing Speech Production Process.

SELF-ASSESSMENT EXERCISE 2

Attempt a brief discussion of the process of sound production

3.4 Sound Articulation: Specific Issues

We have seen in this course that the terms, sound production and sound articulation refer to precisely the same events. So, practically everything we have discussed in this course so far can come under the heading: sound articulation. In this section therefore, we shall tidy up a lot of the things we have so far discussed in this course, but will also place appropriate emphasis on issues which may be more gainfully discussed under the heading sound articulation.

First, we can refer to the organs of speech as the articulators. In that case the articulators may be seen as belonging to two groups – those which are relatively fixed and those which are relatively movable. The fixed articulators are generally said to be passive ones; the movable articulators are generally said to be active ones.

This is accurate from a physical/anatomical viewpoint: a fixed organ is inactive and thus passive from the standpoint of mobility; a movable organ is agile and thus active from the same standpoint of mobility. In phonetic terms however, a passive articulator is not necessarily fixed in

the physical or traditional sense: it is simply the articulator that remains motionless, waiting (so to say), for the movable one to get to it for the purpose of a particular sound articulation. The active articulator on the other hand is phonetically the one that ensures or sparks off the articulation of a particular sound. An illustration will make this clear: even though the upper/lower lips are generally classified among the movable organs yet in the realisation of sounds, the upper lips are the passive articulators while the lower lips are the active articulators; for example in the realisation of labio-dental sounds. Also, if in the articulation of a sound, the uvula is made to play rapidly against the back of the tongue, the uvula thus remains as the active articulator while the back of the tongue becomes the passive articulator…It is important to note that articulatory movements are largely upward movements (cf, Abercrombie, 1975:43), i.e. the active articulators which are largely located on the lower side of the vocal tract tend to move upward to meet the passive articulators which tend to be on the upper side of the vocal tract. So it is more accurate to say that while the great majority of the so called fixed organs of speech are passive articulators and the great majority of the so called active articulators are the movable organs, it is the specific role of a given organ at a given instance that determines passivity or activity.

4.0 CONCLUSION

You have studied in this unit, that speech production is a very important event in both phonetics and phonology. From this unit, you are also in a position to appreciate the roles played by specific human organs as well as the stages in the production of speech.

5.0 SUMMARY

From this unit, you have:
(i) revisited the nature of speech sounds;
(ii) studied speech production processes;
(iii) identified stages of speech production.

6.0 TUTOR-MARKED ASSIGNMENT

Briefly state how you would trace the journey of any given sound from the time it leaves the lungs to the time it is produced. Specify the language.

7.0 REFERENCES/FURTHER READING

Abercrombie, D. (1975). *Elements of General Phonetics*. Edinburgh: Edinburgh University Press.

Clark, J. & Yallop, C. (1990). *An Introduction to Phonetics and Phonology*: Oxford; Basil Blackwell.

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UNIT 3 THE BASIC SOUNDS OF ENGLISH

CONTENTS

1.0 INTRODUCTION

This unit introduces you to various preliminary issues involved in the description of the basic sounds (of English) and then a formal description of such sounds.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the term basic sounds;
- identify the full range of basic sounds in English;
- explain the key matters involved in the description of the sounds; and
- carry out a formal description of the consonant as well as the vowel sounds of English.

3.0 MAIN CONTENT

3.1 Preliminary Steps to a Description of Vowels and Consonants

You have learnt that the point in this course that sounds are better referred to by the use of symbols. That is precisely our target in this section: to use symbols to represent sounds. Meanwhile, it is important to note that sounds in natural languages are traditionally known to fall into two groups: vowels and consonants. The vowels are those sounds which are generally produced (or realised) without any audible obstruction in the speech organs. The realisation of consonant sounds,

on the other hand, is always followed by some form of obstruction which could be partial or total.

At this stage in your study, you are exposed to the basic sounds of one language (English) with appropriate illustrations. You are instructed to apply the same principles in the determination of basic sounds in your language. At the next section of this unit, you will be in a position to learn to describe each basic sound as a way of ensuring your greater mastery of the subject. The issue of speech organs is also very important. Turn to unit 5 of this Module and familiarise yourself with specific organs which produce specific sounds. After that, study the following full list of vowels and consonants as preparatory steps to their description.

(a) Vowels

1. [i:] as in eat, beam, fee.
2. [ɪ] as in it, sit, city.
3. [e] as in egg, bed, fed.
4. [æ] as in atmosphere, pan, tan.
5. [a:] as in ark, part, bar.
6. [ɔ] as in on, pot, dot.
7. [ɔ:] as in order, port, war.
8. [ʊ] as in took, full, pull.
9. [u:] as in ooze, pool, too.
10. [ʌ] as in up, bud, cut.
11. [3:] as in early, girl, stir.
12. [ə] as in ago, forward, after

These twelve are generally referred to as the pure vowels or the mono thongs. Beyond these, there are 8 sounds, each of double symbols – the first one mark the starting point in the realisation and the second one marks the direction of movement. These are called diphthongs. The 8 diphthongs are:

13 [ei] as in age, maid, say
14 [ai] as in eye, tied, thy
15 [ɔi] as in oil, toil, boy
16 [əʊ] as in ego, home, so
17 [aʊ] as in now, pound, how
18 [iə] as in ear, here, fear
19 [eə] as in pair, chair, hair
20 [uə] as in poor, tour, sure

As can be observed, each vowel in the 8 diph thongs, had already been listed, so the diphthongs are made up of selections from the pure vowels.

Still under the vowels, English has 5 triphthongs. Triphthongs are three sounds in one, usually with a diphthong followed by [ə]. The triphthongs are:

21 [ei+ ə; eiə] as in player.
22 [ai + ə; aiə] as in fire.
23 [ɔi + ə; ɔiə] as in lawyer.
24 [əʊ + ə; əʊə] as in lower.
25 [aʊ + ə; aʊə] as in hour

(b) **Consonants**

We have shown in section 3.0 that consonants constitute the second set of basic sounds in a set of basic sounds in natural languages, in this case English. In line with our approach, we list below the consonant sounds of English with appropriate illustrations for the obvious reason that we shall revisit them for the purpose of description.

The consonants of English are:

[p] as in pin, tipper, leap
[b] as in boy, baby, babe
[t] as in tin, sitting, dart
[d] as in do, divider, did
[k] as in king, market, kick
[g] as in good, plugging, mug
[f] as in fire, fifty, life
[v] as in voice, reviving, survive
[θ] as in thigh, thought, path
[ð] as in this, breathing, bathe
[s] as in sing, past, brass
[z] as in zoo, losing, booze
[ʃ] as in shoe, washing, push
[ʒ] as in measure, treasure, vision
[h] as in hide, rehearse
[ʧ] as in change, preaching, teach
[ʤ] as in John, enjoy, judge
[m] as in man, naming, comb
[n] as in know, burning, none
[ŋ] as in bring, singing
[l] as in love, lulled, pull
[r] as in rice, price
[w] as in war, bewitch
[j] as in young, yes, year

3.2 Formal Description of the Consonant Sounds of English

You are now in a position to combine your knowledge of the speech organs and of the consonant sounds of English to make sense of the following descriptions of English consonant sounds:

[p] voiceless bilabial plosive
[b] voiced bilabial plosive
[t] voiceless alveolar plosive
[d] voiced alveolar plosive
[k] voiceless velar plosive
[g] voiced velar plosive
[f] voiceless labio-dental fricative
[v] voiced labio-dental fricative
[θ] voiceless dental fricative
[ð] voiced dental fricative
[s] voiceless alveolar fricative
[z] voiced alveolar fricative
[ʃ] voiceless palato-alveolar fricative
[ʒ] voiced palato-alveolar fricative
[h] voiceless glottal fricative
[ʧ] voiceless palato-alveolar affricate
[ʤ] voiced palato-alveolar affricate
[m] bilabial nasal
[n] alveolar nasal
[ŋ] velar nasal
[l] alveolar liquid (lateral)
[r] alveolar liquid (rolled)
[w] bilabial semi-vowel.
[j] palatal semi-vowel

Below is the English Consonants Chart

	Bilabial	**Labio-dental**	**Dental**	**Alveolar**	**Palato-Alveolar**	**Palatal**	**Velar**	**Glottal**
Plosive	p b		t d				k g	
Nasal	m		n				ŋ	
Liquid (lateral) Liquid (rolled)			l r					
Fricatives		f v	θ ð	s z	ʃ ʒ			h
Affricates					ʧ ʤ			
Semi vowels	w					j		

Figure 5 English Consonant Chart

SELF-ASSESSMENT EXERCISE

i. Attempt a clear description of the following consonant sounds: [r, d, z, ʧ, m].
ii. Briefly distinguish between vowels and consonants from the viewpoint of production.

3.3 Formal Description of the Vowel Sounds of English

Just as you have done in the case of consonants, you are now in a position to describe the vowel sounds of English.

The twelve English vowels which qualify as pure vowels or mono thongs have conventionally been assigned numbers. These are:

1. [i:] close, front, unrounded, long
2. [ɪ] between close and half-close, front, somewhat retracted, unrounded, short
3. [e] between half-close and half-open, front, unrounded, short
4. [æ] between half-open and open, front, unrounded, short
5. [a:] open, almost back, unrounded, long
6. [ɔ] nearly open, back, rounded, short
7. [ɔ:] between half-open and half-close, back rounded, long
8. [u] between close and half-close, back, rounded, short
9. [u:] close, back, rounded, long
10 [ʌ] half-open, central, unrounded, short

11. [əː] between half-close and half-open, central, unrounded, long

12. [ə] between half-open and half-close, central, unrounded, very short

The other vowels of English are combinations which result in either diphthongs or triphthongs, as we can see later in this section.

Below is the English Pure Vowels Chart

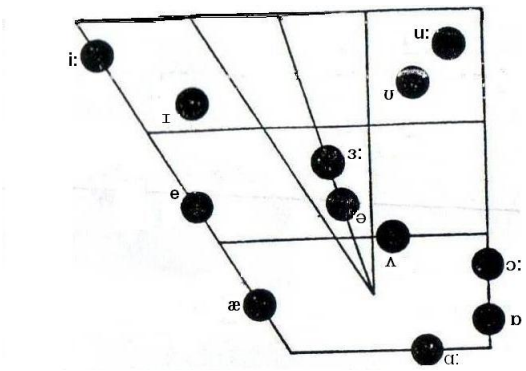

Figure 6 Diagram Illustrating the Formation of the Pure Vowels of English

4.0 CONCLUSION

You have in this unit, seen the differences between the vowels and the consonants and have learnt the formal description of each set of basic sounds. You can listen to the realisation of the vowels and consonants as recorded on your enclosed audio tapes.

5.0 SUMMARY

From this unit, you have been exposed to the conditions which help you to understand the formal description of the vowels and consonants of English. You are also now in a position to appreciate the formal description of the basic sounds of English.

6.0 TUTOR-MARKED ASSIGNMENT

Select any 5 vowels and any 5 consonants of English and attempt a formal description of them. Do not include any entries from the self-assessment exercise of this unit.

7.0 REFERENCES/FURTHER READING

Eka, D. & Inyang, U. (1996). *Aspects of Spoken Language*. Calabar, BON Universal Ltd.

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