

**Course Guide?**

COURSE GUIDE

COURSE CODE: ENG841

COURSE TITLE: ADVANCED ENGLISH PHONETICS AND PHONOLOGY

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## Course Guide

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## Introduction

Welcome to ENG 841: Advanced English Phonetics and Phonology. This course Guide is a general overview of the course. It provides you with useful information about the structure of the course. The course is available toward the award of second degree in English. The course materials can also be useful for students pursuing other degrees in linguistics. PhD students specialising in English and linguistics may also find the course useful.

ENG 841: Advanced English Phonetics and Phonology is a three-credit unit course meant to be taken by the 800 level students. The course is available to all students in the English Department of the National Open University of Nigeria.

The Course Guide tells you briefly what the course is about, what you are expected to know in each unit, what course materials you will be use and how you can work your way through the materials. It also emphasises the need for student's Self-Assessment Exercises (SAEs) and Tutor – Marked Assignments (TMAs). Detailed

information on SAEs and TMAs is found in a separate file, which will be sent to you later.

There are periodic tutorial classes that are linked to this course.

### **What You Will Learn in this Course**

The general aim of this course is to serve as a follow-up to the courses you have previously learnt such as: test of orals, spoken English and introduction to general phonetics and phonology of English. It is also meant to improve both your perceptive and receptive skills in the sound system of the English language.

### **Course Aims**

ENG. 841: Advanced English Phonetics and Phonology. The course aims at providing you an insight and understanding of the phonology of varieties of English.

#### **Course Aims:**

- The aim of this course is to assist you to learn phonetics and phonology of English
- It exposes you to the phonology of British and American English
- It assists you to learn the theories of segmental and suprasegmental features of English
- It equips you with the knowledge of phonology of Nigerian English
- It is also meant to expose you to New Englishes model and Spoken Nigerian English

### **COURSE OBJECTIVES**

To achieve the aims set out above, there are set overall objectives. Besides, each unit has its specific objectives. The unit objectives will be included at the beginning of each unit. You should read them before you start working through the unit. It is advisable that you refer to them during your study of the unit to check on your progress. At the end of every unit, you should also revise the unit objectives. In this way you can be sure that you have done all you are expected to do in the unit.

Listed below are the broader objectives of this course. It is expected that by meeting these objectives, the overall aims of the course must have been achieved. At the end of this course, you should be able to:

On successful completion of the course, you should be able to:

- Identify the concept of phonemes of English by different schools of thought
- Identify, describe and British and American English vowel and consonant sounds
- Identify, describe theories of English phonology for segmental and suprasegmental features
- Identify, describe Spoken Nigerian English and New Englishes model

### **Working through this Course**

To complete this course, you are required to read the study units, read the recommended books and the other materials provided by the National Open University of Nigeria (NOUN). As explained in an earlier paragraph, each unit contains Self-Assessment Exercises, and at points during the course you are required to submit assignments for assessment purposes. At the end of this course there is a final examination. Below, you will find listed all the components of the course and what you have to do.

### **COURSE REQUIREMENTS**

To be considered fully prepared for the course, you are required to read the course material thoroughly and similarly read the sets of books recommended that may enhance your comprehension of the course. You are also required to go through the exercises provided in each of the units. The exercises are meant to evaluate your understanding of each unit. At the end of each unit, you are to answer in written form the Tutor Marked Assignments (TMA) and submit them to your facilitator for assessment purposes. At the end of the course you will be required as well to write a final examination to examine your knowledge on the course.

### **COURSE MATERIALS**

The major course materials required for the course are:

- Course Guide
- Study units
- Relevant textbooks, including the ones listed at the end of each unit
- Assignment file
- Presentation schedule

You must obtain these materials. You may contact your tutor if you have problems in obtaining the next materials.

### **STUDY UNITS**

To achieve our sets aims and objectives, this course has 17 units of five modules as shown below:

#### **Module 1: phonetics and phonology of English**

Unit 1: Concept of Phonetics

Unit 2: Concept of phonology

Unit 3: Concept of the phoneme and allophone

Unit 4: Major views on the concept of the phonemes/concepts in phonemic analysis

#### **Module 2: Generative Phonology**

Unit 1: Overview of generative phonology

Unit 2: Suprasegmental features in generative phonology

Unit 3: Extending the frontiers of Phonological rules

### **Module 3: Metrical Phonology**

Unit 1: Overview of metrical phonology

Unit 2: Metrical Phonology and Stress

Unit 3: Concept of Extra-metricity

### **Module 4: Optimality Theory**

Unit 1: Overview of Optimality theory

Unit 2: Constraint families in optimality theory

Unit 3: Segmental features and optimality theory

Unit 4: Supra-segmental features and optimality theory

### **Module 5: Phonology of Nigerian English**

Unit 1: Overview of Nigerian English

Unit 2: Segmental features of Nigerian English

Unit 3: Suprasegmental features of Nigerian English

## **STRATEGIES FOR STUDYING THE COURSE**

Although you will be required to study the lecture units on your own, the university authorities have made adequate arrangement with the facilitators for regular interaction and to guide you through the course in your various study centres. The facilitators are expected to conduct tutorials and useful discussion sessions with you and other members of your programme at the study centres.

## **PRESENTATION SCHEDULE**

The date to finish the course and the procedure for the submission of your TMA will be made known to you by the authorities in a later date. You are advised to adhere strictly to instruction and regulation on how to go through your TMA and the examinations so that you can come out with good grades in this course.

## **SUMMARY**

This course guide is a general over-time of ENG 531: Advanced English Phonetics and Phonology. On completion of the course, you will have a better insight into the English phonetics and phonology and varieties of English by native and non-native speakers. You will also be aware of theories of phonology that enhance study of phonemes of different varieties of English. The course is quite interesting as it revolves practice, instrumentation and exposure

to scientific approach of phonemes beyond basic phonetics and phonology you were familiar with.

### Set Textbooks

These textbooks are recommended for your study in this course. You will also find some useful ones under the reference list in the course book.

Ashby, Michael & Maidment, John. (2005). *Introducing phonetic science*. Cambridge: Cambridge University Press.

Gimson, A.C. (1980). *An introduction to the pronunciation of English*. London: ELBS & Edward Arnold.

Jones, Daniel (2006). (Eds.) Peter Roach, James Hartman, & Jane Setter. *Cambridge English pronouncing dictionary 17<sup>th</sup> Edition*. Cambridge: Cambridge University Press.

Jolayemi, 'Demola. (2006). *The stress pattern of Nigerian English: An empirical phonology approach*. Göttingen, Germany: Cuvillier Verlag.

Roach, Peter. (2000). *English phonetics and phonology* (2<sup>nd</sup> Ed.). Cambridge: Cambridge University Press.

O'Connor, J.D. (1973). *Phonetics*. Harmondsworth: Penguin.

Daniel, I. O. (2011). *Introductory Phonetics and Phonology*. Newcastle upon Tyne: Cambridge Publishing

Daniel, I. O. A. (2018). Phonetics and Phonology II: The English Suprasegmentals. In I. O. A. Daniel, *Communication and Language Skills* (pp.77-93). Newcastle upon Tyne: Cambridge Scholar Publishing

### Other Learning Aids

In addition to the set books above, you should try to secure some recorded cassettes or CDs on the Received Pronunciation of English. Some of them come with some of the set textbooks. You may also request your class facilitator, who is better informed than you on this highly technical course, to procure some of the oral aids. If you are able to procure a CD of, for instance *Daniel Jones pronouncing dictionary*, you may be able to install it in your desktop, or laptop if you have one, attached to a pair of loud speakers or ear piece. This will, particularly, be helpful for the mastery of the aspects of the English phonology,

**Commented [u1]:** What is the order of arranging these books? Alphabetic or in the order of importance? The alphabetic order may be more convenient. Add these references and the two course materials for the undergraduate level to this section: ENG241 and ENG341.

especially, as outlined in this course. It will afford you the opportunities to:

- listen to the RP rendition of a large number of English words;
- listen to the GA rendition of a large number of English words;
- record rendition of any English word or group and listen to it;
- compare your recording with either of RP or GA; and
- see and practise the correct transcription of a large number of English words in RP or GA.

You will also need a mirror of the size of your palm. This is mandatory for tutorial attendance.

#### **Set Textbooks Postscript**

- The above books are classical reading materials, not just for this course but also for other courses in the phonetics and phonology of English and other English related courses that you may wish to pursue in the future; the university should encourage all the students to procure them.
- Jolayemi (2006) was published in December, 2006 by a German publisher. A copy is presently sold at €29.00, but the price may reduce if the university would assist the students to purchase copies *en masse* by contacting the publishers directly through: [www.cuvillier.de](http://www.cuvillier.de)
- Bulky purchase of Daniel Jones' *Cambridge English pronouncing dictionary* will also make copies less costly. And more importantly, if they are purchased from a good source, pronouncing software in a CD that come with the book will be very, very useful to you. The CD you often get in some of the pirated copies of the book you buy just anywhere are mere imitations. They cannot be installed, thereby, robbing you of a huge body of knowledge on the phonology of English that you can self-assess from the pronouncing dictionary.

#### **Assignment file**

In this file you will find all the details of the work you must submit to your tutor for marking. The marks you obtain from these assignments will count toward the final mark you obtain for this course. Further information on assignment will be found in the assignment file itself and later in this Course Guide in the section on assessment.

#### **Presentation Schedule**

The “presentation schedule” included in your course materials gives you the important dates for the completion of your tutor-marked assignments and attending

tutorials. Remember, you are required to submit all your assignments as and when due.

## **ASSESSMENT FILE**

Assessment file for the course will be made available to you by the university authorities. In this file you will find details of work that must be done and submitted within a time frame to your facilitators to mark and score. This will form part of your Continuous assessment (CA) which will constitute part of your total scores in the final examination on this course. You are required to pass the CA and the main examination to be considered duly grounded in this course.

### **Tutor Marked Assignments (TMAs)**

There are twenty tutor assignments in this course. You need to submit all the assignments. The best three (that is, the three with the highest grades of twenty assignments) will be counted. The total mark of the best three will be 30% of your total course mark.

Assignments for the units in this course are contained in the Assignment File. You should be able to complete your assignments from the information and materials contained in your set textbooks, reading and study units. However, you are advised to use other references to broaden your viewpoint and provide a deeper understanding of the subject.

### **Final Examination and Grading**

The examination will consist of questions you will come across in tutor-marked assignments. You are therefore advised to revise the entire course after studying the last unit before you sit for the examination.

Course Marking Scheme

**The table below gives a breakdown of the course mark:**

<b>Assessment</b>	<b>Marks</b>
Assignments 1-20	Three assignments, best three marks of the assignments counts for 30% of course marks.
Final examination	The final examination counts for 70% of overall marks.
Total	100% of course marks

**Table 1: Course Marking Scheme**

[Course Overview](#)

This table brings together the units, the number of works you should take to complete.

Unit	Title of Work	Week's Activity	Assessment (end of unit)
<b>Module 1: Phonetics and Phonology of English</b>			
	Course Guide	1	
1	Concept of Phonetics	2	Assignment 1
2	Concept of phonology	3	Assignment 2
<b>Module 2: Generative Phonology</b>			
1	Overview of generative phonology	4	Assignment 3
2	Suprasegmental features in generative phonology	5	Assignment 4
3	Extending the frontiers of Phonological rules	6	Assignment 5
<b>Module 3: Metrical phonology</b>			
1	Overview of metrical phonology	7	Assignment 6
2	Metrical Phonology and Stress	8	Assignment 7
3	Concept of Extra-metricity	9	Assignment 8
<b>Module 4: Optimality theory</b>			
1	Overview of Optimality theory	10	Assignment 9
2	Constraint families in optimality theory	11	Assignment 10
3	Segmental features and optimality theory	12	Assignment 11
4	Supra-segmental features and optimality theory	13	Assignment 12
<b>Module 5: Nigerian English phonology</b>			
1	Overview of Nigerian English	13	Assignment 12
2	Segmental features of Nigerian English	14	Assignment 13
3	Suprasegmental features of Nigerian English	15	Assignment 14

**Table 2: Course Overview**

## How to Get the Best from this Course

In distance learning, the study units replace the university lectures. This is one of the great advantages of the distance learning system. You can read and work through specially designed study materials at your own pace.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Following this is a set of learning objectives. These objectives enable you to know what you should be able to do by the time you have completed the unit. The objectives should guide your study. After studying the units, cross check whether you have achieved the objectives. If you adhere strictly to this art of checking whether the objective is achieved or not, you will definitely improve your chances of passing the course.

The main body of the unit guides you through the required reading from other sources. This will usually be either from your set books or from a “Reading” section. Whenever you need help, don’t hesitate to call and ask your tutor to provide it.

1. Read through this Course Guide thoroughly.
2. Plan your study schedule. You should refer to the ‘course overview’ for more details. Find out the time you are expected to spend on each unit and when and how to turn in your assignments.
3. Stick to your study schedule. Don’t allow anything to get you distracted from your study schedule.
4. Turn to Unit 1 and read the introduction and objectives for the unit.
5. Gather the study material you need. A unit is given in the ‘Overview’ at the beginning of each unit. The study unit you are working on and one of your set books should be on your desk at the same time.
6. Work through the unit. The content of the unit has been arranged in a sequential order. Instructions would be given on where to read from your set books or other articles. Use the unit to guide your reading.
7. Review the objectives for each study unit to confirm you have achieved them.

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8. Don't proceed to the next unit, until you are sure you have achieved the objectives of the unit you are working on.

9. Don't wait until your assignment is returned before working on the next unit. Keep to your schedule.

10. When you complete the last unit, you can be preparing for examinations. Be sure that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this Course Guide).

### **Tutors and Tutorials**

There are 8 hours of online tutorials provided in support of this course. The dates, times and location of these tutorials, together with the name and phone number of your tutor will be communicated to you. This will be done as you are allocated to a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulty, you might encounter and provide assistance to you during the course. You must mail your tutor-marked assignments to your tutor well before the due date (at least two working days are required). They will be marked by your tutor and returned to you as soon as possible. Do not hesitate to contact our tutor by telephone, email or discussion board if you need help. The following might be the circumstances in which you will find help necessary.

#### **Contact your tutor if:**

- You do not understand any part of the study units or the assigned readings.
- You have difficulty with the self-tests or exercises, and
- You have a question or problem with an assignment, with your tutor's comment on an assignment or with the grading of an assignment.

You should try your best to attend the tutorials. This is the only chance to interact with your tutor by asking questions which are answered instantly. You can raise any problem encountered in the course of your study. To maximise the benefits of the course tutorials, it is advisable that you prepare a question list before attending them. When you participate in the discussions, your intellectual knowledge will be deeply enriched.

### **Summary**

The attempt in this Course Guide is to launch you into how to set about using this course book. It is also to assist you to have, as much information

as possible, on how to make the maximum use of the book, all of which is geared to satisfactorily acquiring the set objectives of the phonology of English. This has been achieved by methodically explaining to you:

- what you will learn in this course;
- the general aims and specific objectives of the course;
- the course materials and how to working through them;
- an overview of the 15 unit course in 5 modules;
- some set textbooks and other learning aids;
- your assignment file and presentation schedule;
- the required assessment, examination and grading methods; and
- how to get the best from this course and your tutors.

**MODULE 1: PHONETICS AND PHONOLOGY OF ENGLISH**

UNIT 1: Concept of the phoneme and allophone

UNIT 2: Major views on the concept of the phonemes/concepts in phonemic analysis

UNIT 3: Concept of phonetics and phonology

## UNIT 1: Concept of phoneme

### 1.0 Introduction

### 2.0 Objectives

### 3.0 Main Content

#### 3.1 Concept of phoneme

#### 3.2 Problems in phonemic analysis

##### 3.2.1 Affricates

##### 3.2.1.1 Classification of phonetics and allophone

##### 3.2.1.2 Phonemic distribution

##### 3.2.1.3 Relationship of /tʃ/ and /dʒ/ to consonants

#### 3.3 Syllabic consonants

#### 3.4 Clusters of 's' with plosives

#### 3.5 Schwa

#### 3.6 Vowel nasalisation of allophone

##### 3.6.1 Allophones of /t/

### 4.0 Self-Assessment Exercises (SAE)

### 5.0 Summary

### 6.0 Tutor Marked Assignment (TMA)

### 7.0 References/Further Reading

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## 1.0 INTRODUCTION

Phoneme is a family of sounds in a given language, which consists of an important sound of the language together with other related sounds, for example, it takes its place in particular sound – sequences. Gimson (1980:43) views 'a phoneme is an abstract linguistic unit which can bring about a change in meaning'. It can be seen as a minimal unit of sound which is capable of distinguishing words of different meanings. It is a fundamental unit of phonology. (Osisanwo, 2012)

## 2.0 OBJECTIVES

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

- Define and identify phoneme
- Define and identify allophone
- Identify concepts in phonemes
- Identify and describe problems in phonemic analysis
- Differentiate clearly between a phoneme and an allophone

## 3.0 MAIN CONTENT

### 3.1 The Concept of the Phoneme

The word *phoneme* has been defined as a bundle of abstract distinctive features or oppositions between sounds, that is, voiced or voiceless. It has also been otherwise defined as a ‘family’ or related sound rather than as oppositions or contrastive elements. Issues about the phoneme fall within the ambit of ‘phonemics’ and within the larger purview of phonology, hence its description as phonemic phonology. Linguists that adopt these phonemic principles are often known as phonemicists. This Unit considers in particular the various theoretical descriptions of the phoneme in order to explain its importance in phonology.

For example:

Graphic shape	Phonetic transcription	Phonemic transcription
<pin>	[p <sup>h</sup> ɪn]	/pɪn/
<nip>	[nɪp̚]	/nɪp/
<spin>	[spɪn]	/spɪn/

The number of speech sounds in English varies from dialect to dialect, and any actual tally depends greatly on the interpretation of the researcher doing the counting. The Longman Pronunciation Dictionary by John C. Wells, for example, using symbols of the International Phonetic Alphabet, denotes 24 consonants and 23 vowels used in Received Pronunciation, plus two additional consonants and four additional vowels used in foreign words only. For General American (American English version), it provides for 25 consonants and 19 vowels, with one additional consonant and three additional vowels for foreign words. The American Heritage Dictionary, on the other hand, suggests 25 consonants and 18 vowels (including r-coloured vowels) for American English, plus one consonant and five vowels for non-English terms.

The word *phoneme* relates to *phonetics* and *phonology*. For instance, *phonetics* is a branch of Linguistics that is concerned with the scientific study of how speech sounds are produced, transmitted and perceived. The ultimate preoccupation of a phonetician is to carry out rigorous

studies of human sounds made for the significance of communication. In addition to that, the knowledge of phonemes helps to identify, categorise and explain transmission and perception of human sounds in articulatory, acoustic and auditory manner.

### 3.2 Problems in phonemic analysis

There are problems of different types. In some cases, there lies difficulty in deciding on the overall phonemic system of the accent while in others, there lies concernment of how particular sound fits into the system. A number of such problems are identified and discussed below:

#### 3.2.1 Affricates

The affricates tʃ, dʒ are, phonetically, composed of a plosive followed by a fricative. It is possible to treat each of the pair tʃ, dʒ as a single consonant phoneme; it is called the one-phoneme analysis of tʃ, dʒ. It is also possible to say that they are composed of two phonemes each – t plus ʃ, and d plus ʒ respectively – all of which are already established as independent phonemes of English; this will be called the two-phoneme analysis of tʃ, dʒ. If we adopted the two-phoneme analysis, the words ‘church’ and ‘judge’ would be composed of five phonemes each, like:

t - ʃ - ʒ - t - ʃ - d - ʒ - ʌ - d - ʒ

instead of the three phonemes that result from the one-phoneme analysis:

tʃ - ʒ - tʃ - dʒ - ʌ - dʒ

and there would be no separate tʃ, dʒ phonemes. But how can one decide which analysis is preferable? The two-phoneme analysis has one main advantage; if there are no separate tʃ, dʒ phonemes, then the set of English consonants is smaller. Phonologists have claimed that one should prefer the analysis which is the most ‘economical’ in the number of phonemes it results into. The argument for this might be based on the claim that when one speaks to another using

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a code and the most efficient codes do not employ unnecessary symbols. Furthermore, it can be claimed that a phonological analysis is a type of scientific theory, and a scientific theory should be stated as economically as possible. However, it is the one-phoneme analysis that is generally chosen by phonologists. Nonetheless, there are several arguments. Though none is conclusive, one-phoneme analysis seems to be preferable.

### 3.2.1.1 Clarification of phonetics and allophones

One argument could be called ‘phonetic’ or ‘allophonic’; if it could be shown that the phonetic quality of the t and f (or d and ʒ) in tʃ, dʒ is clearly different from realisations of t, ʃ, d, ʒ found elsewhere in similar contexts, this would support the analysis of tʃ, dʒ as separate phonemes. As an example, it might be claimed that ʃ in ‘hutch’ (hʌtʃ) was different (perhaps in having shorter duration) from ʃ in ‘hush’ (hʌʃ) or ‘welsh’ (welʃ); or it might be claimed that the place of articulation of t in ‘watch apes’ wɒtʃeɪps was different from that of t in ‘what shapes’ wɒtʃeɪps. This argument is a weak one. There is no clear evidence that such phonetic differences exist, and even if there were such an evidence, it would be easy to produce explanations for the differences that did not depend on phonemic analyses (e.g. the position of the word boundary in ‘watch apes’, ‘what shapes’).

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### 3.2.1.2 Phoneme distribution of /tʃ/ and /dʒ/

It could be argued that the proposed phonemes /tʃ/ and /dʒ/ have distributions similar to other consonants, while other combinations of plosive plus fricative do not. It can easily be shown that /tʃ/ and /dʒ/ are found initially, medially and finally, and that no other combination (e.g. pʃ, dʒ, tθ) has such a wide distribution. However, several consonants are generally accepted as phonemes of the British accent despite not being free to occur in all positions (e.g. /r, w, j, h, ŋ, ʒ/). This argument, although supporting the one-phoneme analysis, does not

actually prove that /tʃ/ and /dʒ/ must be classed with other single-consonant phonemes.

### 3.2.1.3 Relationship of /tʃ/ and /dʒ/ to consonants

If /tʃ/ and /dʒ/ were able to combine quite freely with other consonants to form consonant clusters, this would support the one-phoneme analysis. In initial position, however, /tʃ/ and /dʒ/ never occur in clusters with other consonants. In final position in the syllable, we find that /tʃ/ can be followed by /t/ (e.g. 'watched' /wɒtʃt/) and /dʒ/ by /d/ (e.g. 'wedged' /wedʒd/). Final /tʃ/, /dʒ/ can be preceded by /l/ (e.g. 'squelch' /skwɛltʃ/, 'bulge' /bʌldʒ/); /ʒ/ is never preceded by /l/, and /ʃ/ is preceded by /l/ only in a few words and names (e.g. 'Welsh' /welʃ/, 'Walsh' /wɒlʃ/). A fairly similar situation is found if one asks if n can precede /tʃ/, /dʒ/; some British speakers have ntʃ in 'lunch', 'French', etc., and never pronounce the sequence nʃ within a syllable, while other speakers (like me) always have nʃ in these contexts and never ntʃ. In words like 'lunge', 'flange' there seems to be no possible phonological distinction between lʌndʒ, flændʒ and lenʒ, flænʒ. It seems, then, that no contrast between syllable-final lʃ and ltʃ exists in the British English accent, and the same appears to be true in relation to nʃ and ntʃ and nʒ and ndʒ. There are no other possibilities for final-consonant clusters containing tʃ, dʒ, except that the pre-final l or n may occur in combination with post-final t, d as in 'squelched' skwɛltʃt, 'hinged' hindʒd. It could not, then be said that tʃ, dʒ combine freely with other consonants if forming consonant clusters: this is particularly noticeable in initial position.

Finally, it has been suggested that native speakers of English who have not been taught phonetics feel that tʃ, dʒ are each 'one sound'. One should be guided by intuitions and prefer the one-phoneme analysis. The problem with this is that discovering what untrained (or 'native') speakers feel about their own language is not

as easy as it might sound. It would be necessary to ask questions like this: ‘Would you say that the word ‘chip’ begins with one sound – like ‘tip’ and ‘sip’ – or with two sounds – like ‘trip’ and ‘skip’? But the results would be distorted by the fact that two consonant letters are used in the spelling; to do the test properly one should use illiterate subjects, which raises many further problems. The discussion of the phonemic status of tʃ, dʒ shows how difficult it can be to reach a conclusion in phonemic analysis.

### 3.3.2 The English Vowel System

The analysis of the English vowel system contains a large number of phonemes, and it is not surprising that some phonologists who believe in the importance of keeping the total number of phonemes small propose different analyses, which contain fewer than ten vowel phonemes and treat all long vowels and diphthongs as composed of two phonemes each. There are different ways of doing this: one way is to treat long vowels and diphthongs as composed of two vowel phonemes. Starting with a set of basic or ‘simple’ vowel phonemes (e.g. ɪ, e, æ, ʌ, ɒ, u, ə) it is possible to make up long vowels by using short vowels twice. Our usual transcription for long vowels is given in brackets:

ii (i:) ææ (a:) ɒɒ (ɔ:) əə (ɜ:)

This can be made to look less unusual by choosing different symbols for the basic vowels. We will use ɪ, e, æ, ʌ, ɒ, u, ə: thus i: could be transcribed as ii, a: as aa, ɔ: as ɔɔ, u: as uu and ə: as əə. In this approach, diphthongs would be composed of a basic vowel phoneme followed by ə, and would therefore be composed of three phonemes.

Another way of doing this kind of analysis is to treat long vowels and diphthongs as composed of a vowel plus a consonant; this may seem a less obvious way of proceeding, but it was for many years the choice of most American phonologists. The idea is that long vowels

and diphthongs are composed of a basic vowel phoneme followed by one j, w, h, (we should add r for rhotic accents). Thus, the diphthongs would be made like this (our usual transcription is given in brackets):

ej (ei) əw (əu) ih (iə)  
 æj (ai) æw (au) eh (eə)  
 ɒj (ɔi) uh (uə)

Long vowels:

ij (i:) əh (a:) ɒh (ɔ:) əh (ɜ:) uw (u:)

diphthongs and long vowels are now of exactly the same phonological composition. An important point about this analysis is that j, w, h, do not otherwise occur finally in the syllable. In this analysis, the inequality of distribution is corrected.

### 3.3 Syllabic consonants

A final analysis problem considers how to deal with syllabic consonants. It has to be recognised that syllabic consonants are a problem: they are phonologically different from their non-syllabic counterparts. It is called minimal pairs.

<i>Syllabic</i>	<i>Non-syllabic</i>
'coddling' kɒdliŋ	'codling' kɒdliŋ
'Hungary' hʌŋgri	'hungry' hʌŋgri

The possibility is to add new consonant phonemes to the list. The distribution of these consonants would be rather limited, but the main problem would be fitting them into a pattern of syllable structure. For a word like 'button' bʌtŋ or 'bottle' bɒtli, it would be necessary to add ŋ, l to the first post-final set, the argument would be extended to include the r in 'Hungary'. But if these consonants now form part of a syllable-final consonant cluster, how does one account for the fact that English speakers hear the consonants as extra syllables? The question

might be answered by saying that the new phonemes are to be classed as vowels. Another possibility is to set up a phoneme that we might name *syllabicity*, symbolised with the mark (̣). Then the word ‘codling’ would consist of the following six phonemes: k - ɒ - d - l - i - ŋ, while the word ‘coddling’ would consist of the following *seven* phonemes: k - ɒ - d - l and simultaneously ̣ - l - ŋ. This is superficially an attractive theory, but the proposed phoneme is nothing like the other phonemes we have identified up to this point – putting it simply, the syllabic mark does not have any sound.

Some phonologists maintain that a syllabic consonant is really a case of a vowel and a consonant that have become combined. Let us suppose that the vowel is ə. We could then say that, for example, ‘Hungary’ is phonemically hʌŋgəri while ‘hungry’ is hʌŋgri; it would then be necessary to say that the ə vowel phoneme in the phonemic representation is not pronounced as a vowel, but instead causes the following consonant to become syllabic. This is an example of the abstract view of phonology where the way a word is represented phonologically may be significantly different from the actual sequence of sounds heard, so that the phonetic and the phonemic levels are quite widely separated.

### **3.4 Clusters of s with plosives**

Words like ‘spill’, ‘still’, ‘skill’ are usually represented with the phonemes p, t, k following the s, but, as many writers have pointed out, it would be quite reasonable to transcribe them with b, d, g instead. For example, b, d, and g are unaspirated while p, t, k in syllable-initial position are usually aspirated. However, sp, st, sk, one finds an aspirated plosive, and there could be an argument for transcribing them as sb, sd, sg. One does not do this, perhaps because of the spelling, but it is important to remember that the contrast between p and b, between t and d and between k and g are neutralised in this context.

### **3.5 Schwa**

It has been suggested that there is not really a contrast between ə and ʌ, since ə only occurs in weak syllables and no minimal pairs can be found to show a clear contrast between ə and ʌ in unstressed syllables (although there have been some ingenious attempts). This has resulted in a proposal that the phoneme symbol ə should be used for representing any occurrence of ə or ʌ, so that 'cup' (which is usually stressed) would be transcribed 'kəp and 'upper' (with stress on the initial syllable) as 'əpə. This new ə phoneme would thus have two allophones, one being ə and the other ʌ; the stress mark would indicate that ʌ allophone and in weak syllables with no stress it would be more likely that the ə allophone would be pronounced.

Other phonologists have suggested that ə is an allophone of several other vowels; for example, compare the middle two syllables in the words 'economy' r'kɒnəmi and 'economic' i:kə'nɒmɪk – it appears that when the stress moves away from the syllable containing ɒ the vowel becomes ə. Similarly, compare 'Germanic' dʒɜ:'mænɪk with 'German' 'dʒɜ:mən – when the stress is taken away from the syllable mæn, the vowel weakens to ə. The conclusion that could be drawn from this argument is that ə is not phoneme of English, but is an allophone of several different vowel phonemes when those phonemes occur in an unstressed syllable. The argument is in some ways quite an attractive one, but since it leads to a rather complex and abstract phonemic analysis, it is not adopted for this course.

In conclusion, this section addressed different ways to analyse the English phonemic system; each argument has advantages and disadvantages. One needs to consider the practical goal of teaching or learning about English pronunciation, and for this purpose a very abstract analysis would be unsuitable. This is one criterion for judging the value of an analysis; unless one believes in carrying out phonological analysis for purely aesthetic reasons. The only other important criterion is whether the analysis is likely to correspond to the representation of sounds in human brain. Linguistic theory is preoccupied with economy, elegance and simplicity, but cognitive psychology and neuropsychology show us that the brain often uses

different pathways to the same goal.

### **3.6 Allophone**

Allophones are class-members of a phoneme. They are variants of a phoneme. Jolayemi et al (2010:84) see allophone as an 'ally of phone'. In other words, an allophone is a phoneme that shares similarities of pronunciation with a phoneme. More technically, allophones are phonemes, they share a variety of pronunciations with a common phoneme. These varieties are determined by phonetic circumstances such as types of words, morphemes or positions. Ashby and Maidment (2005:189) define an allophone as 'a speech sound considered as a positional variant of a phoneme'. In other words, allophones are different realisations of a phoneme, for instance, the phoneme /t/ has at least two variants, that is the aspirated [t<sup>h</sup>] as it reflects in words like *tick*, that is, [t<sup>h</sup>ɪk] and the unaspirated [t] in words like [set]. These are two different allophones which belong to the same phoneme. In addition to that, in words like *tray* and *ray*, the two /r/ sounds are very different, because /r/ in *ray* is voiced and non-fricative, while the /r/ sound in *tray* is voiceless and fricative. Nevertheless, the two types of /r/ here, that is the voiceless and the voiced are allophones of the same /r/ variant.

### **3.6 Vowel Nasalisation of Allophone**

English contains a general phonological rule that determines the contexts in which vowels are nasalised. Vowels are produced with little restriction of the airflow from the lungs out of the mouth and/or the nose. The quality of a vowel depends on the shape of the vocal tract as the air passes through. Different parts of the tongue may be high or low in the mouth; the lips may be spread or pursed; the velum may be raised or lowered. Vowel sounds carry pitch and loudness; you can sing vowels or shout vowels. They may be longer or shorter in duration. Vowels can stand alone - they can be produced without consonants before or after them. Linguists can describe vowels acoustically or electronically. A vowel becomes nasalised when

it occurs before nasal sounds, thus, vowels are nasalised before a nasal consonant within the same syllable.

Bean [bɪ̃n]    bead [bid]  
roam [rɔ̃m]    road [rəud]

Nasalised vowels occur only before nasal consonants and never elsewhere.

### 3.6.1 Allophones of /t/

A particular realisation (pronunciation) of a phoneme is called a *phone*. The collection of phones that are the realisations of the same phoneme are called the *allophones* of that phoneme. In English, each vowel phoneme has both an oral and a nasalised allophone. The choice of the allophone is not random or haphazard; it is *rule-governed*. To distinguish between a phoneme and its allophones, we use slashes // to enclose phonemes and continue to use square brackets [ ] for allophones or phones. For instance, [i] and [ĩ] are allophones of the phoneme /i/, and so on.

Consonant sounds also have allophones whose distribution is rule-governed. For /t/ the following examples illustrate the point.

Tick [t<sup>h</sup>ɪk]    stick [stɪk]    hits [hɪts]

In *tick* we normally find an aspirated [t<sup>h</sup>], whereas in *stick* and *hits* we find an unaspirated [t], whether we pronounce *tick* as [t<sup>h</sup>ɪk] or [tɪk], we speak the same thing. The allophones of a phoneme do not *contrast*. Each of these phonemes has its own set of allophones, even if that set consists of a single phone, which would mean there is only one pronunciation in all environments. Most phonemes have more than one allophone and the phonological rules dictate when the different allophones occur. It should be clear at this point that pronunciation is not a

random process. It is systematic and rule-governed, and while the systems and the rules may appear complex, they are no more than a compendium of the knowledge that every speaker has.

#### 4.0 SELF-ASSESSMENT EXERCISES (SAE)

Let us round off this unit by drawing your attention to the self-assessment exercises below:

1. Differentiate clearly between a phoneme and an allophone, giving clear examples
2. Describe a phoneme with examples
3. What practical problems could be encountered in phonemic analysis?

#### 5.0 SUMMARY

- The word *phoneme* has been defined as a bundle of abstract distinctive features or oppositions between sounds, that is, voiced or voiceless. Examples are below:
  - Affricates
  - Clarification of phonetics and allophones
  - Phoneme distribution of /tʃ/ and /dʒ/
  - Relationship of /tʃ/ and /dʒ/ to consonants
- The English vowel system contains a large number of phonemes. There are different ways of doing this: one way is to treat long vowels and diphthongs as composed of two vowel phonemes.
- Syllabic consonants consider how to deal with syllabic consonants.
- Clusters of *s* with plosives are usually represented with the phonemes p, t, k following the *s*.
- Schwa is not really a contrast between ə and ʌ, since ə only occurs in weak syllables and no minimal pairs can be found to show a clear contrast between ə and ʌ in unstressed syllables.

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- Allophones are class-members of a phoneme. They are variants of a phoneme.
- Vowel Nasalisation of Allophone contains a general phonological rule that determines the contexts where vowels are nasalised.
- Allophones of /t/ have allophones whose distribution is rule-governed. For /t/ the following examples/t/ in tick [tʰɪk], stick [stɪk], hits [hɪts]

## 6.0 TUTOR-MARKED ASSESSMENT

Account for the phonetic similarity/difference with the initial consonant sounds in the following paired words:

- a. Key/cat
- b. Port/praise
- c. Talk/true

## 7.0 REFERENCES/FURTHER READING

- Ashby, M. & Maidment, J. (2005). *Introducing Phonetic Science*. Cambridge: Cambridge University Press.
- Daniel, I. O. (2011). *Introductory Phonetics and Phonology*. Newcastle upon Tyne: Cambridge Scholars Publishing
- Hockett, F. C. (1970). *A Course in Modern Linguistics*. Oxford and IBH, New Delhi.
- Lyons, J. (1972). *New Horizons in Linguistics*. London: Penguin.
- Varshney, R. L (1993). *An Introductory Textbook of Linguistics and Phonetics*. Students store: Bareilly (UP).
- Gimson, A.C. (1980). *An introduction to the pronunciation of English*. London: ELBS & Edward Arnold.

**Commented [u8]:** Can we improve on the references? These are quite old. I have also added a text you may find useful. You may also need to be more careful in your documentation. Alphabetical order and proper punctuation are important parts of proper documentation.

## UNIT 2: Major Views on the concept of the Phoneme/concepts in phonemic analysis

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Major Views on the concept of the Phoneme

3.1.1 Phoneme as a phonetic reality

3.1.1 Phoneme as a phonological reality

3.1.3 Phoneme as a psychological reality

3.2 Concepts used in phonemic analysis

3.2.1 Phonemes in contrastive distribution

3.2.2 Phonemes in complementary distribution

3.2.3 Phonemes in free variation

4 Self-Assessment Exercises (SAE)

5 Summary

6 Tutor Marked Assignment (TMA)

7 References/Further Reading

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### 1.0 INTRODUCTION

Roach (1997:38) says phonemes are abstract. Scholars have made attempts to view the phoneme from different angles; hence, Hyman (1975) says that there are three major views of the phoneme. The three views of the phoneme are:

- The phoneme as a phonetic reality
- The phoneme as a phonological reality

- The phoneme as a psychological reality

## **2.0 OBJECTIVES**

At the end of the Unit, you should be able to:

- Identify and discuss the three major views of phonologists on the concept of phoneme
- Differentiate between the concept of phoneme held by different schools of thought
- Identify concepts used in phoneme analysis
- Identify the phoneme in contrastive and complementary distribution

## **3.0 MAIN CONTENT**

### **3.1 Views of phonologists on the concept of the Phoneme:**

Views of phonologists vary on the concept of the phoneme. Different schools of thought in phonology hold views that have shaped the analysis of the phoneme. Three of these views are rife in the literature. These views are discussed in what follows.

#### **3.1.1 The phoneme as a phonetic reality**

This represents the view that the phoneme is a physical phonetic reality, that is, sounds which belong to the same phoneme share important phonetic properties. Hence, Gleason (1955:261) sees a phoneme as a class of sounds which are not only phonetically similar but which also show certain characteristic patterns of distribution in the language or the dialect under consideration. This school of thought considered the concept of the phoneme extensively under the minimal pairs, complementary distribution, phonetic similarity and free variation.

#### **3.1.2 The phoneme as a phonological reality**

This is the idea of the Prague School of Phonology, which sees the phoneme as the sum of the phonologically relevant properties of a sound (Trubetzkoy, 1939:36). What is most important to this school is function. In other words, a phoneme is a phonological unit that can function to

distinguish meanings. It is seen as an abstraction and not a sound or even a group of sounds. To them, it is a theoretical construct on the phonological level, which is defined in terms of its contrast within a system. This school of thought considered the concept of the phoneme extensively under the idea of phonemic overlapping, neutralisation, among others.

### **3.1.3 The phoneme as a psychological reality**

According to Twaddell (1935:56), the original mentalist position as espoused by Badouin de Courtenay sees the phoneme as 'a mental reality, as the intention of the speaker or the impression of the hearer, or both'. It holds the view that each time a speaker pronounces, for example, the sound [p], it is never acoustically quite the same as the last [p] or the [p] before the new one. Hence, Badouin de Courtenay sees the phoneme as a sound imagined or intended by the speaker as opposed to the sound that is actually emitted as a 'psychophonetic' phenomenon to the 'physiophonetic' fact. For example, in American English, when a speaker says [ai misə], that is *I miss you*, the real intention is actually to say [ai mis ju]. This school of thought considered the concept of the phoneme extensively under the levels of adequacy, grammatical prerequisites to phonology, among others. However, several scholars have criticised the views of this school.

## **3.2. Concepts used in phonemes analysis**

The phoneme has been defined as a bundle of abstract distinctive features or oppositions between sounds, that is, voiced or voiceless. It has also been otherwise defined as a 'family' of related sounds rather than as oppositions or contrastive elements. Issues about the phoneme fall within the ambit of 'phonemics' and within the larger purview of phonology.

### **3.2.1 Phonemes in contrastive distribution**

In phonology, phonemes in opposition are otherwise regarded as phonemes in contrastive distribution or as minimal pairs. These are pairs of words in a particular language, which differ in only one phonological element and have a distinct meaning. They are used to demonstrate that two sound segments constitute two separate phonemes in the language. For instance, for English vowels, the pair 'let' and 'lit' can be used to demonstrate that the phonemes /e/ (in *let*) and /ɪ/ (in *lit*) represent distinct phonemes /e/ and /ɪ/. An example for English consonants occurs in the minimal pair 'pat' and 'bat' with the /p/ and /b/ in the initial position. Minimal pairs have a minimum difference occurring at the initial, medial or final positions of the pair or words.

**Examples:** pin /pɪn/      bin /bɪn/  
zeal /zi:l/      seal /si:l/  
pen /pen/      pan /pæn/  
hat /hæt/      had /hæd/

The difference might occur between vowels or between consonants but one vital feature of minimal pairs is that the difference in the phonemes must be only one. The only one difference must also occur at the same opposition.

### 3.2.2 Phonemes in complementary distribution

When phonemes are in complementary distribution, they are known as allophones. An allophone is not distinctive; rather, it is a variant of a phoneme. In other words, changing the allophone will not change the meaning of a word; although the result may sound different one from another due to its phonetic environment.

Not all phonemes have significantly different allophones. Allophones are detectable commonly in voiceless plosives. For example, [p<sup>h</sup>] in *pin* [p<sup>h</sup>ɪn] and *spin* [spɪn] are all allophones of the phoneme /p/ in English because they cannot distinguish words. In other words, they are only

complementing the phoneme /p/, hence they are complements. When this happens, such allophones are said to be in complementary distribution. English speakers treat them as the same sound, but they are different: the first in *pin* is aspirated [p<sup>h</sup>] while the second in *spin* is unaspirated (plain). Plain [p] also occurs in the second <p> in *paper* [p<sup>h</sup>ei.pə]. However, an unreleased or unexploded <p> occurs in the word *cap* [k<sup>h</sup>æp].

### 3.2.3 Phonemes in free variation

The possibility of two graphemes being realised as two different phonemes in the same context without causing a change in meaning is often referred to as free variation. Even in native English, there are several words that have a single grapheme being realised as two different phonemes such as the <e> in *ego* realised as /e/ or /i/. The concept of free variation vividly reveals the seriousness of the problem of matching sounds with spelling in English. This concept is even more pronounced with the upsurge of varieties. They are especially prominent in the most common ones, which are the British and American varieties of English. Words such as *tomatoes*, *lieutenant* and *schedule* are pronounced differently in the two varieties but since meaning is not affected, these words are described as being in free variation. It is important to note that when stress placement leads to a change in meaning this is not free variation. For instance, the word *rebel*, /rebəl/ has stress on the initial syllable when it is a noun and on the second syllable /ri'bel/ when it is a verb. In this regard, *rebel* (a noun) and *rebel* (a verb) are not examples of words in free variation because meaning has been altered.

## 4.0 SELF-ASSESSMENT EXERCISES (SAE)

Let us conclude this Unit by drawing your attention to the following self-assessment exercises:

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- a. Identify and discuss the three views of phonologists on the concept of the phoneme
- b. Itemise and succinctly discuss four concepts used in phoneme analysis
- c. What is the interface between phoneme as an opposition and phoneme in complementary distribution?

### **5.0 SUMMARY**

- The phoneme as a phonetic reality represents that phoneme is a physical phonetic reality, that is sounds which belong to the same phoneme share important phonetic properties.
- The phoneme as a phonological reality is the idea of Prague School of Phonology, the idea sees the phoneme as the sum of the phonologically relevant properties of a sound
- The phoneme as a psychological reality sees the phoneme as ‘a mental reality, as the intention of the speaker or the impression of the hearer, or both’.
- Concepts used in phonemes described a ‘family’ of related sounds rather than as oppositions or contrastive elements.
  - a. Phonemes in contrastive distribution
  - b. Phonemes in complementary distribution
  - c. Phonemes in free variation

### **6.0 TUTOR MARKED ASSIGNMENT**

1. Differentiate between the concept of the phoneme held by different schools of thought in phonology

2. Discuss how phonemes in contrastive distribution is different from phonemes in complimentary distribution

## 7.0 FURTHER READING

Daniel, I. O. (2011). *Introductory Phonetics and Phonology*. Newcastle upon Tyne: Cambridge Scholars Publishing

Hyman, D. (1975). *Phonology: Theory and Analysis*. U.S.A.: Holt, Rhinehart and Winston.

Roach, P. (1997). On the distinction between 'stress-timed' and 'syllable-timed' languages. In D. Crystal (Ed.). *Linguistic Controversies*. London: Edward Arnold.

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## UNIT 3: Concept of Phonetics

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Theoretical Background on Phonetics

3.2 Articulatory phonetics

3.2.1 Place of Articulation of Speech Sounds

3.2.2 Manner of Speech Production

3.2.3 Quality of Speech Production

3.3 Acoustic Phonetics

3.4 Auditory Phonetics

4.0 Self-Assessment Exercise (SAE)

5.0 Summary

6.0 Tutor Marked Assignment (TMA)

7.0 References/Further Reading

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## 1.0 INTRODUCTION

Phonetics, as a branch of Linguistics. It is concerned with the scientific study of how speech sounds are produced, transmitted and perceived. The primary duty of a phonetician is to carry out rigorous studies of the human sounds made for the purpose of communication. The main aim of this is to be able to identify all the possible human sounds made for the purpose of oral communication. Another purpose of a phonetic study is to be able to describe and explain each of these identified sounds. One last main purpose of a phonetician is to be able to explain how these human sounds are produced (articulatory), transmitted (acoustic) and perceived (auditory). These form the three major (but not always easy to differentiate) types of phonetics, as shall be explained shortly.

## 2.0 OBJECTIVES

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

- define phonetics
- identify the main duties of a phonetician
- name a few notable phoneticians across the world
- list phonetician's working tools
- explain the three main branches of phonetics.

### 3.0 MAIN CONTENT

#### 3.1 THEORETICAL BACKGROUND ON PHONETICS

Phoneticians all over the world have been engaged in the scientific investigation into the workings of the human speech sounds. This engagement was dated back to years before Christ. Precisely, Clark and Yallop (1992), confirms that as early as many centuries before Christ was born, the Indians had concerned themselves with the study of Sanskrit and done a lot of work in articulatory phonetics (p. 329), and so were linguists in China, Japan, Greece and Rome. Much of what we now learn in phonetics were efforts contributed by these ancient linguists and passed to us by the nineteen-century linguists. Such nineteen-century linguists were: Baudouin de Courtenay (1845-1929), a Polish; Ferdinand de Saussure (1875-1913), a Swiss; Henry Sweet (1845-1912) and Daniel Jones (1881-1967), both were English; Franz Boas (1858-1942), German; Edward Sapir (1884-1939) and Leonard Bloomfield (1887-1949) were both Americans. You would have, therefore, realised that many linguists had done so much work in the past, a lot more still goes on.

**Commented [u13]:** It is so interesting that no African is listed here. Can this be a balanced scholarship?

As I have said earlier, the main concern of a phonetician is the scientific study of *all* possible human sounds that are meant for speech communication. His primary focus is on human speech sounds, not of any particular language. Thus, it is possible for him to investigate the speech sounds of a language he does not quite understand, speak, read or write because his primary focus is on the examination of the human speech sounds, how they are produced, transmitted and perceived. To achieve this, he needs to observe, listen, record and analyse what he hears said. For this, he must be a good observer, listener, recorder and analyst. At the same time, he must have some tools handy to do all this, as reliability on his own senses alone may not give the desired results. In the past, the tools were few and far between, making observation, recording and analysis a tedious thing to do. But with modern technology, you can now observe, record and analyse with great accuracy, any human speech (and indeed non-human) sounds.

At the observatory and recording levels, you will need, apart from your sharp ears (which you *must* train), a good audio recording machine and video recording machine, you will need software, too – audio and video cassettes. You will also need to go with your pen, pencil, and other writing materials. Remember to wrap all this in waterproof containers (in case it rains or you need to cross a river!). In the past, machines such as Oscillomink and Visi-Pitch were often used to analyse corpora data (recorded utterances; singular: corpus datum). Other analysis tools are the X-Ray and the scanners. At the present moment, a number of computer programs have been devised and found to be highly useful for a phonetic analysis.

**Commented [u14]:** Are these still being used these days?

Let me mention some of them: PRAAT, Speech Analyzer, Wavesurfer and LingWAVES. But in case you do not have your corpora as sound files or they are still in the audiocassette, you cannot use any of these computer programs. This means that, you then must find a way to covert and transfer them into the computer by a means of another program called the *Audacity*.

Phoneticians represent the speech sounds they hear in signs called *phonetic symbols*, which they usually enclose in square brackets [ ]. Remember that what you have transcribed in such square brackets are sounds from the human speech and *not* from any specific language. Remember, too, that such sounds are transcribed using phonetic symbols agreed upon by a consensus among members of *IPA*, an abbreviation for both the name of the association (International Phonetic Association) and the alphabet or symbols used for transcription (International Phonetic Alphabet). Let us now turn our attention to the three main branches of phonetics, as discussed in Units 3:2-4 below.

### 3.2 ARTICULATORY PHONETICS

In speech making, certain speech organs are brought together at various places and manners. These organs come together to shape or moderate the sound signals produced from the larynx. Major among these organs are the lips, teeth, teeth ridge, tongue, pharynx, and even the nose, etc. All these are usually categorised into the pharyngeal, oral and nasal cavities, which form what is called the *vocal tract*. (Note: *It is my belief that you have learnt the human organs involved in speech making; if you haven't, you must go back to your notes or course material for ENG241 and ENG341 to revise them*). Housed by these organs are the upper and lower jaws, which come together in the formation or articulation of the speech sounds. Articulatory phonetics, therefore, is the branch of phonetics that is concerned with the study of how the speech sounds are produced. It is concerned with the study of the vowel and the consonant sounds involved in speech making in any language, concentrating on three main areas: place of articulation, manner of articulation, and the quality of production. See the explanation below:

#### 3.2.1 Place of Articulation of Speech Production

The areas of interest of a phonetician, here, are the identification and description of the organ or organs involved in the production of a specific sound; or put in another way, the particular place of the mouth or vocal tract that is used in the production of a specific speech sound. First, let me discuss the place of articulation of the vowel sounds, which are mainly the function of the mouth (tongue and lips). A phonetician may want to know what part of the mouth has been involved in the articulation of a particular vowel sound. Is it at the front such as [i], centre such as [ə] or back such as [ɑ]? For the place of articulation of the consonant sounds, the phonetician may want to find out if a particular sound is produced with the two lips (*bilabial* – Latin word for two lips, *bi* (two), *labial* (lip) such as [p, b, m]; a lip and a set of teeth (*labio-dental*) such as the upper set of teeth and lower lip, [f, v]; or the two sets of teeth (*dental*) such as [ð, θ]. Other places of articulation of consonant sounds are the *alveolar*, *velar*, *uvula*, *nasal cavity*, *pharynx* and *glottis*.

### 3.2.2 The Manner of Production

Unlike the place of articulation, which tells the position of the organs of articulation, the manner of speech production concerns the various ways or *how* these articulators produce speech sounds. For the consonant sounds, it is possible to say that some sounds are produced with total closure of the articulators (*stops* or *plosives*), or friction (*Affricates/Fricatives*). Another sound might be produced by the vibration of the tip of the tongue, slightly touching the palate (*Rolled*) or just tapping it (*Tap-Flap*). It is also possible to shape the mouth such that a sound is allowed to pass through a space at both sides of the blade of the tongue and the mouth (*Lateral*), or allow the sound to come out of the vocal tract with little or no obstruction of the articulators (*Approximant* or *Semi Vowel*). As for the manner of producing the vowel sounds, the lips may be rounded, neutral or spread; the mouth may be open, close, partially open or partially close. Also, a vowel sound may be produced while the tongue is high, level or low.

### 3.2.3 The Quality of Sound Production

By the quality of speech production, I mean: (i) the quantity or length of time expended on a sound; (ii) the amount of force or pressure exerted on a sound; (iii) the presence or absence of laryngeal vibrations while producing the sound; or (iv) in some circumstances, a combination of i-iii. By study or intuition (subconscious effort), you will have noticed that you exert a greater force in producing a sound compared with another. Specifically, some terms to describe how sounds are produced are *fortis* or *tense*, when a voiceless consonant is produced with greater force or pressure than its voiced counterpart (e.g. [p] vs [b]). Inversely, a voiced sound like [b] might be produced with a weaker force (*lenis* or *lax*) than its voiceless counterpart [p]. Also, you spend a *long* time producing a sound, for example /u:/ and a *short* time to produce another for example /ʊ/. You also notice that some sounds are voiced because you have produced them with some vibrations coming from your larynx. Some others are voiceless because they are produced with no laryngeal vibrations. This summary ends my brief discussion of the branch of phonetics described as articulatory phonetics. Your attention will now be focused on another branch of phonetics called acoustic phonetics, which is the concern of the next section below.

## 3.3 ACOUSTIC PHONETICS

The branch of phonetics that deals with the frequency and amplitude in the transmission of speech sound is known as acoustic phonetics. An acoustic phonetician studies the waves of the sound produced with the help of instruments. When the sound is produced, the air is set into vibration from the point of production of the sound by some physical agent called the source. The sound travels in all directions at approximately 335.28 metres per second. When the vibrations are regularly spaced in time, we hear a musical tone of a definite pitch, and a noise when they irregularly pass through a band of frequencies. In a pure musical tone, the amount of energy and the intensity of sound

depend on the frequency of the sound produced. For example, if a bow is pulled lightly across the violin string, the amount of energy per unit time will be relatively slight and we hear a soft tone, and if it is pulled rapidly or is pressed heavily, the string will move through a larger arc producing a greater amount of energy per unit time to produce a louder tone of the same pitch.

The properties of sound can be described in terms of three factors: *frequency*, *intensity* and *duration*. In a complex sound, the amount of energy is produced at different frequencies, and the sequence may change rapidly. In such a case, it will be too difficult for the acoustic phonetician to determine the intensity of the frequency per unit time merely by listening. So, for accurate measurement, s/he uses various electronic devices, most importantly the *spectrograph*. When the sound produced from any source is fed into the spectrograph, it produces a kind of picture, called *spectrogram*, in which the frequency, intensity and duration are represented.

Also, any sound, non-human or human, non-speech or speech, travels through a medium such as the air or water or metal. A sound is usually propagated or transmitted by *wave*, which is defined as the periodic displacement of pressure from one point to the other. Through these periodic movements, the wave is able to transmit or propagate a sound from one fixed place to the other. Specifically, the human speech is transmitted by the sound waves that originate from the lungs into the larynx or what is called the voice box. The larynx is usually referred to as the voice box, mainly, because it houses the *vocal folds* whose precursor is the generation of the vibrations that give phonation or the sound waves that lead to the voiced sounds.

The *Source-Filter Theory* recounts that the speech sound generation starts from the lungs, which pump air into the larynx. The air, so pumped, forces the vocal folds housed by the larynx to open and close. When the sound waves that escape through the folds get to the vocal tract, they are moderated by the various speech organs in the vocal tract by the process of filtration; with the vocal tract acting as the acoustic filter. The filtering process converts the sound vibrations from the larynx into the individual speech sounds that we hear. Thus, it can be summarised that in speech production, the sound vibrations from the larynx serve as the input, which is filtered by the vocal tract; the result of the filtration is the output, which we hear as speech in the outer world (Clark & Yallop, 1995: p. 236; Johnson, 2003: p. 79; Jolayemi, 2006: p. 56-57; etc.).

### 3.4 Auditory Phonetics

Auditory phonetics is one of the branches of phonetics that studies the process of hearing and the perception of speech sounds. It includes the study of different

auditory impressions of quality, pitch and loudness of sound, the description of ear and hearing the process. It is the study of the perceptual response to speech sounds by the ear, the auditory nerve and the brain. It is the processing of sounds right from its reception to its interpretation, making discrimination between two different sounds. The main organ of the human body concerned with this is the ear (barring the controversy of the supremacy of the brain or the ear over speech reception and perception). Among the various contesting sounds that bombard the environment that surrounds the ear region every microsecond, the ear consciously selects those that it wishes to process, in this case, speech. It also transmits the selected signals and analyses them.

However, from what is available, the ear is divided into three sections as the outer ear, the middle ear and the inner ear. The *outer ear* comprises the ear lobe that channels the speech sound signals that come from the mouth, through the environment into the ear. It also contains the eardrum a sensitive diaphragm, and a narrow canal that connects the outer world to the eardrum. When the sound signals come from the outer world through the channel, the sensitive diaphragm begins to vibrate repeatedly; and as it does, it causes the air molecules in the canal to shake violently. Note that the intensity of the signals are modified so that the weak signals are amplified or increased, while the loud ones are filtered to be reduced or rejected; thus making the eardrum in the outer ear to perform the functions of a resonator.

These modified sound signals then move on to the next part of the ear called the middle ear. This is another air-filled cavity that connects the eardrum to the inner ear, and it contains a chain of three thin bones. The middle ear, too, is a resonator as it further increases or decreases the amplitude (the acoustic measurement of intensity or loudness) so that the sound signals that are too low to be heard by the ear can be increased and those too loud for the ear can be reduced or rejected. In addition, the middle ear acts as a resonator because its vibrations also set into motion the fluid molecules in the inner ear, thereby, transmitting the speech sound waves coming from the outer ear into the inner.

#### 4.0 SELF-ASSESSMENT EXERCISE (SAE)

We will conclude this unit by drawing your attention to the following self-assessment exercises:

- i. Mention four early phoneticians and period of engagement of each of them.
- ii. Discuss the work of a phonetician and how this is done.
- iii. What can you describe as the vocal tract?
- iv. With three examples, differentiate between lenis and fortis.
- v. Define acoustic phonetics.

Commented [u15]: See note above

## 5.0 SUMMARY

Let's recap what this unit has explained.

- Phonetics is the scientific study of speech sounds and how they are made.
- It is usually studied under three main branches, namely:
  - Articulatory phonetics
  - Acoustic phonetics, and
  - Auditory phonetics.
- By convention, we often enclose phonetic transcriptions in square brackets, e.g. [...].
- Phoneticians, the world over, have an association called the International Phonetics Association (IPA); the conventional phonetic symbols also share the abbreviations, International Phonetics Alphabet (IPA).
- Articulatory phonetics is concerned with how the organs of speech are manipulated to produce speech sounds.
- The speech organs for the production of speech reside in the vocal tract, mainly in the:
  - pharyngeal cavity
  - nasal cavity and oral cavity.
- In describing a phone (speech sound), we are interested in the:
  - manner of articulation
  - place of articulation and quality of articulation.
- Acoustic phonetics is concerned with the sound properties that lead to speech production such as:
  - waves
  - and
  - vibrations.
- It is also the study of how these properties lead to speech sounds such as:
  - the aggressive or pulmonic air from the lungs
  - opening and closing phases of the vocal folds' vibration of the vocal folds and
  - the resonant activities of the vocal tract.
- Auditory phonetics concerns the processing and transmission of speech sound signals to the brain through the three main parts of the ear, which are:
  - the outer ear (eardrum)
  - the middle ear (a chain of three thin bones) and the inner ear (cochlear).

## 6.0 TUTOR MARKED ASSIGNMENT (TMA)

- i. Why will you consider phonetics a scientific study?
- ii. Explain the airstream mechanism
- iii. Write short notes on the following:
  - a) articulatory phonetics,
  - b) acoustic phonetics,
  - c) place of articulation *and*
  - d) manner of speech production.

#### 7.0 REFERENCES/FURTHER READING

- Christophersen, P. (1956). *An English phonetics course*. London: Longman.
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**Commented [u16]:** Add ENG241 and ENG341 course materials to this list.

## UNIT 4: Concept of phonology

1.0 Introduction

2.0 Objectives

3.0 Main Contents

3.1 The Segmental Phonemes

3.2 The Suprasegmental Features

3.3 Mode of Representation and Rules of the Structure of the English Phonemes

4.0 Self-Assessment Exercise (SAE)

5.0 Summary

6.0 Tutor Marked Assignment (TMA)

7.0 References/Further Reading List

**Commented [u17]:** See comment above

### 1.0 INTRODUCTION

Phonology is the scientific study of the sound system of a language. It studies the interactions that occur among the sounds of a specific language. It also involves the rules of interaction of the sound system of the language that make a combination of sounds meaningful and acceptable in the language. The person who is concerned with this type of study is called a phonologist. His primary duty is to investigate how a set of sounds are structured before it makes meaning in the particular language. Based on this some rules or consistent structures are observed and noted.

**Commented [u18]:** Avoid sexist language. Replace with the generic *they* form.

### 2.0 OBJECTIVES

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

- define phonology
- identify some branches of phonology
- discuss some English phonology rules

### 3.0 MAIN CONTENTS

3.1 The Segmental Phonemes

One of the main ways the phonology of a language may be studied is through the examination of the segmental phonemes that are structured or put together as meaningful sound units through which the grammar of the language is projected. You learnt in the previous Unit that sound segments may stand together in any form without making any meaning. However, in English for instance, we know that when a sequence of /b/ + /ʌ/ + /t/ (but) comes in this manner, it is a meaningful entity. Also, /s/ + /k/ + /ɪ/ + /l/ form the English word (skill), which means a special ability. We equally know that when /t/ is affixed to, for instance, “look” at the rear position giving /lokt/ (looked), we have an acceptable past tense of “look” in English. Conversely, if we were to reverse the occurrence of /lokt/, to /tkɔl/, (tkol), we would not have formed any meaningful word in English. Or if we were to pick the first two words in /b/ + /ʌ/ + /t/ or of /s/ + /k/ + /ɪ/ + /l/, to form “bu” and “sk”, respectively, we would of course not be speaking English.

Let’s further give you another illustration to show that a phoneme is the smallest meaningful, contrastive and distinctive sound unit of a language, using English /t/ and /k/. Words such as: take - cake; tool - cool; took - cook; tight - kite, are good examples to show this. This is because when you switch /t/ for /k/ in the positions highlighted, you have a different set of words. It also shows that there are no two types of /t/ or /k/. Again, it is possible for you to divide “took” /tok/ into three phonemes - /t/, /ɒ/ and /k/. But can you further divide or subdivide /t/ or /k/ or /ɒ/? It is absolutely impossible.

What the analysis above shows is that words are formed by a conscious arrangement of segmental (or segmented) phonemes according to an acceptable way in a particular language and not by an arbitrary arrangement of phonemes. It also shows that phonemes are the smallest sound elements or units that are meaningful, through which what one wants to say is said. Lastly, the analysis, equally, shows that these phonemes are broken into single sound elements called segments that are no longer divisible into any further smaller unit. Thus, I hope that the first statement of the above paragraph becomes clear:

One of the main ways the *phonology of a language* may be studied is through the examination of the *segmental phonemes* that are *structured or put together as meaningful sound units* through which the *grammar of the language* is projected. Remember, every language has its own consortium of the segmental phonemes usually called the vowel and consonant sounds. In addition, many languages also have a rapid movement from one vowel to another; this type of sound is called a *diphthong* or *glide*. Yet, some other languages have some glides from a diphthong to another vowel. This type of sound is called a *triphthong*. English is an example of a language that has the full length of the consortium described above. For instance, English language has 12 vowel sounds, 8 diphthongs and about 5 triphthongs, and 24 consonant sounds. Details of this shall be the contents of the next Module. Meanwhile, no language operates with only the segmental or segmented units. A few other sound elements, which operate beyond the phoneme, are also involved in the sound system of a language. They can however not be segmented or divisible into smaller units, yet they complete the meaning of what is

to be said. A phonological discussion of these types of sound features is presented in the next section of this Unit.

### 3.2 Suprasegmental Features

Have you ever heard of the word “supra”? It’s an English word formed from Latin around the 16<sup>th</sup> Century, which means “above”, “over”, “beyond” or “transcends”. If you prefix it to “segment”, you will have “suprasegment”, a word I think you may have come across. As said a little while ago, there are certain phonological features or sound elements that help a speaker to have a complete realisation of his thought. These sound elements transcend the phoneme, the word, the syllable or even a longer utterance. They operate at the composition or prose level; this is the reason such elements are often referred to as *prosody features*. Because these features are used beyond the phoneme, they are also referred to as *suprasegmental features*. A new trend in generative phonology (you will get to know more of this later in this course) championed by Goldsmith (1976) further says that these features we are talking about are separate elements of the speech sound, which are often treated in phonology as part of the phonemes or segments of a speech. He argues that rather, these features should be treated as autonomous segments, thus, they have earned the name *autosegmental features*. Such segments are: length, quality, crescendo, tempo, rhythm, stress and intonation, the last three being most prominent in a language like English (Gimson, 1980: pp. 222-223; Jolayemi, 1999: pp. 79-89). The study of how these features are used, when they are used and the particular interaction of these features with the segmental phonemes resulting in total meaning, fall in the realm of phonology.

**Commented [u19]:** Avoid sexist usages as much as possible.

### 3.3 Mode of Representation and Rules of the Structure of Phonology

In phonology the smallest sound unit is the phoneme. We often use these phonemes to undertake phonemic analysis. Because we must be carrying out this analysis of a specific language, we often enclose the transcription in slashed brackets - /.../ as you would have noticed in 3.1, which is what is called the *phonemic transcription*. In doing all this, we often involve the phonemic symbols, a complete set of which is available in the table of IPA. You must have learnt these symbols, especially the English phonemic symbols; but the detailed description will be reserved till a little later in the course.

Another main concern of a phonological study borders on the determination of how the speech sounds of a language are structured so as to present to people what you have on your mind. All languages have their rules, different from one another. For example, the English language has a rule that accounts for the change in pronunciation occasioned by the change in the grammatical status of the word. Morphologically, a word like “complete” /kəmpli:t/, a verb becomes “completion” /kəmplɛʃən/ when used as a noun. Two sounds, phonemically, you will notice, make the verb sound differently from the noun; the final vowel /i:/ changes to /ɛ/ and the final consonant, /t/ changes to /ʃ/. Some examples in this category include: redeem – redemption and; however, such a phonemic change does not affect a word like delete – deletion. When there is a phonemic change in a pronunciation of a word because of the change in word

class (morphology), as in the examples I just gave, we say the word has operated on a morphophonemic rule.

Let us look at these words that are considered to operate other morphophonemic rules, this time of present to past tense:

Group A	Group B	Group C
mess – messed	call – called	resist – resisted
sex – sexed	measure – measured	wade – waded
sack – sacked	gag – gagged	rest – rested
sack – sacks	boy – boys	kiss – kisses

#### 4.0 SELF-ASSESSMENT EXERCISES (SAE)

We will round off this Unit by drawing your attention to the following self-assessment exercises:

1. What is a phoneme?
2. Identify some branches of phonology
3. Define the suprasegmental features.
4. List 3 examples of features studied under Autosegmental features
5. Name 2 synonyms you can use instead of Autosegmental features

#### 5.0 SUMMARY

From this Unit, you have learned the following main points:

- Phonology is the scientific study of speech sound system of a language
- It is usually studied under three main branches, namely:
  - Segmental phonemes such as the:
    - pure vowels
    - diphthongs
    - triphthongs and - consonants.
  - Autosegmental features such as:
    - stress
    - intonation and
    - tempo
- As a study of the sound system of a language, phonology also concerns the study of the phonological rules that operate in the target language, like the morphophonemic rules in the English language.

#### 6.0 TUTOR MARKED ASSIGNMENT (TMA)

1. With adequate illustration, discuss phonology.
2. Discuss the nature of the English stress
3. With copious examples, discuss segmental phonology

#### 7.0 REFERENCES/FURTHER READING

- Daniel, I. O. A. (2018). Phonetics and Phonology II: The English Suprasegmentals. In I. O. A. Daniel, *Communication and Language Skills* (pp.77-93). Newcastle upon Tyne: Cambridge Scholar Publishing
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## MODULE 3: GENERATIVE PHONOLOGY I

Unit 1: Generative phonology: overview, phonological rules and feature descriptions

Unit 2: Extending the frontiers of Generative Phonology

Unit 3: Suprasegmental features in generative phonology

Commented [u20]: So, where is Module 2?

### Unit 1: Overview of generative phonology

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 An overview of generative phonology

3.2 Basic concepts of Generative Phonology

3.2.1 Distinctive features

3.2.2 Redundancy

3.2.3 Boundaries

3.2.4 Phonemic level of representation

3.2.5 Phonetic level of representation

3.3 Phonological Rules

3.3.1 Examples of Phonological Rules

4.0 Self-Assessment Exercise (SAE)

5.0 Summary

6.0 Tutor Marked Assignment (TMA)

7.0 References/Further Reading

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### 1.0 INTRODUCTION

One of the theories that have transformed the world of linguistics is Transformational Generative Grammar. Chomsky began this theory in 1957, with his *Syntactic Structures*. It is essentially a syntactic theory. The theory is still relevant today; it is still being used in phonology analysis.

### 2.0 OBJECTIVES

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

- i. trace the origin of generative phonology
- ii. discuss the levels of representation
- iii. explain natural classes in relation to distinctive features
- iv. identify and discuss functions of phonological rules
- v. state and formalise phonological rules

### 3.0 MAIN CONTENT

#### 3.1 Overview

Classical phonology dominated phonological enquiry from the mid-1960s. It focused on phonic features that serve in the language being investigated, or phonic feature that can serve in natural language to differentiate one utterance from another (Sommerstein, 1977).

However, since the appearance in 1959 of Morris Halle's *The Sound Patterns of Russia*, there arose a new view. This view looks at the principle that determines the pronunciation of the words, phrases and sentences of a language and the extent to which these principles that can be derived from more general principles determine the organization of all human languages. In other words, this view looks at phonology as a way of reducing the various human articulation forms in each language.

The name given to his approach is Generative Phonology. This theory became elaborate when Chomsky and Halle's work - *The Sound Pattern of English (SPE)* – was published in 1968. The SPE became the classic in this area of linguistics. It has been a departure point for subsequent works.

#### 3.2 Basic Concepts of Generative Phonology

##### 3.2.1 Distinctive features

Distinctive features are those features that mark out a phoneme as being distinct from others. Many generative phonologists have worked in this area. They, according to Hyman (1975), include Jakobson, Fant and Halle (1952) and Jakobson and Halle (1956). Jakobson laid emphasis on capturing all the possible phonological contrasts of their features: one, the distinctive features are designed to capture the phonological contrasts of languages; two, they are designed to give a description of the phonetic content of segments that are derived by phonological rules and underlying segments (Hyman, 1975).

Schane (1973) identifies five criteria for choosing features:

- i. The features must have their foundation in phonetics. Thus, a feature may have articulatory, acoustic or perceptual correlates. For example, [coronal], [high] are articulatory correlates; [sonorant], [strident] are acoustic; while [syllabic], [stress] are perceptual.
- ii. The features have to adequately cater for characterizing important phonetic differences between languages.
- iii. The principal allophones of a language must be accommodated by the features.
- iv. All the necessary contrasts within phonemes must be accommodated by the set of features.

- v. The appropriate natural classes for stating phonological changes, which segments that share phonetic traits undergo, must be provided by a set of features.

There are two binary features, which express two major classes of sounds: Continuant and Sonorant. They are otherwise known as major class features. Both of them have four possible combinations, according to Giegerich (1992):

- +sonorant
- +continuant → approximants
- sonorant
- +sonorant
- +continuant → approximants
- sonorant
- +continuant → fricatives
- +sonorant
- continuant → nasal stops
- sonorant
- continuant → oral stops (plosives)

The class of approximant is a heterogeneous one because all vowels are inclusive, that is, they have the feature specification [+sonorant, +continuant]. The subclass of semivowels /j, w/ and the subclass /l, r/, otherwise known as liquids, also have this feature specification. It is only liquids, which are clearly consonantal in phonetic terms.

### 3.2.2 Redundancy

Sunday (2019:39) claims that each language has its own particular redundancies. This is not just imposed on the code so as to make it efficient and practical. Conversely, most sequence redundancies, for instance, are a consequence of internal constraints on the physical functioning of the vocal mechanism. A redundant feature, at times, plays a more important role in perception than one that is not redundant. For instance, aspiration of English voiceless plosives in initial position in a stressed syllable is redundant but, from a perceptual point of view, it is perhaps the major clue for identifying these initial segments (Schane, 1973).

### 3.2.3 Boundaries

There are four types of boundary that are universal as noted by Sommerstein (1997):

- Syllable boundary: the units which this boundary demarcates do not have any relation to grammar at all. Thus, it does not belong to the hierarchy. In fact, it is not referred to at all in *SPE*.
- Morpheme boundary: it is usually symbolised by † . It appears between each morpheme and what follows it, except some stronger boundary comes at the same place. Chomsky and Halle (1968) call this Formative Boundary. It has the following features:
  - +formative boundary
  - segment
- Word boundary: # is the symbol of word boundary. A word is inserted in surface syntactic structure before and after every major category constituent – every noun, verb or noun phrase, verb phrase or adjective phrase.
- Phonological boundary: this boundary demarcates units, which form the highest domain of phonological processes. This domain is similar to a single intonation contour. It should be noted that across a phonological phrase boundary, no rule can ever apply.

### 3.2.4 Phonemic level of representation

Sunday (2019:41) asserts that phonemic level of representation is otherwise known as the abstract or underlying level or representation. On this level, only properties that are phonologically relevant are represented. Phonological relevance in this context connotes phonological contractiveness. The primary unit of this level is the non-predictable distinctive features of the string of phonemes that represent the words. The phonemic level could be referred to as the dictionary form of a word. It is the input to phonological rules to get actual sound as produced in utterances (Fromkin & Rodman, 1978; Giegerich, 1992).

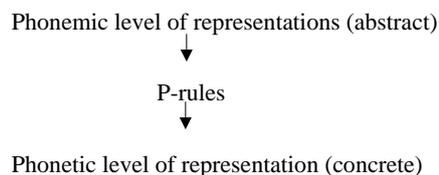
### 3.2.5 Phonetic level of representation

The phonetic level is the level of actual production of sounds. After the phonological rules have operated on the phonemic level of representation, the output is the phonetic representation of such a word. In Generative Phonology, the level of phonetic representation is called Systematic Phonetic Representation. This is because the level of Systematic Phonetic Representation is abstracted from the physical phonetics since it indicates the variant, which is part of the recognised allophonic norms of a language. This level contains redundant information, that is, phonetic features which are not used in the phonetic distinction of the language (Giegerich, 1992). It is after the application of all rules of the phonology of a language that one can have a full phonetic representation. It is important to identify that there exists an interface between D-structure and S-structure where Abstract level describes phonemics while concrete level (surface structure) describes phonetics.

### 3.3 Phonological Rules

Phonological rules are those rules, which provide the phonetic information necessary for the pronunciation of utterances. There are two main levels of phonological representation. Goldsmith (1995) defines phonological rules as mapping between two different levels of sounds representation. That is, the underlying level and the surface level. Hayes (2009) explains phonological rule as the different ways a sound can be pronounced in different environments. This means that phonological rule states how a speaker goes from the abstract representation stored in the brain to the actual sound they articulate when they speak.

The first is the phonemic level, which is abstract. The second level is the phonetic level, which is concrete. By applying some rules, on the abstract level, it is possible to generate some concrete structures, which exist at the concrete level. The interface between the abstract level and the concrete is known as p-rules (phonological rules). These are rules that change the abstract level to the concrete level. Phonological rules perform different functions:



Formalisation of rules: instead of describing phonological rules (p-rules) in informal terms, linguists have devised a formal and scientific way of describing them. These rules now appear mathematical and easy to remember. These formal notations do not only save long statements or papers, but they also make it easy to generalise languages. They also make it easy to identify sounds that belong to natural classes graphologically. Besides, formalisation of rule better represents what individuals know about phonological rules (Fromkin & Rodman, 1978).

The following are some of the notations used in formalising p-rules:

→	=	Changes to or becomes
∅	=	delete
+	=	plus
#	=	word boundary /word finally
+	=	morpheme boundary
—	=	before or after
/	=	in the environment of
[ ]	=	Phonetic transcription
h	=	aspiration
-	=	the position of the sound
[-]	=	has not the feature
[+]	=	has the feature
~	=	nasalisation symbol
+	=	morpheme boundary

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### 3.3.1 Examples of phonological rules

#### (A) Nasalisation rule

This rule states that vowels are nasalized before a nasal consonant within the same syllable.

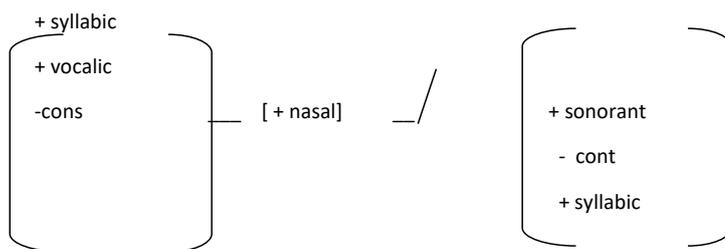
$$V \rightarrow [+nasal] / \_ \_ [+nasal] \$$$

This rule tells us that the vowels in such words as den /den/ will become nasalized to /ɛ̃/, dental /ɛ̃/ will be pronounced /ɛ̃/.

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#### Rule Formalisation

##### Vowel



(B) Deletion rule is a phonological rule that handles the formal presentation of sound segments that are deleted in a word.

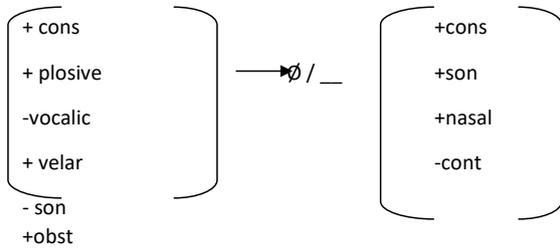
- i. This rule states that /g/ should be deleted when it occurs in word initial position or final position before a nasal sound. E.g., phlegm/flem/

Resign /rizain/, gnostic /ɡnɒstɪk/

**Commented [u24]:** Phonetic transcription not visible.

#### Rule Formalisation

$$/g/ \rightarrow \emptyset / \_ \_ [+nasal] \#$$



(C) /b/  $\longrightarrow \emptyset / [m] \#$

This rule state that /b/ should be deleted when it occurs after/m/ in a word final position

/b/  $\longrightarrow \emptyset / [m] \#$

Examples dumb/ / tomb / / comb / / womb / /



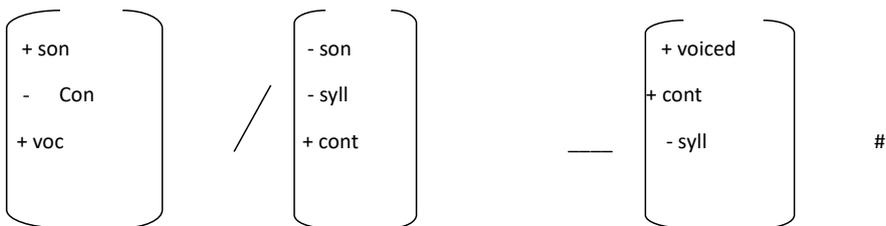
(D) Insert /i/ before the plural morpheme /z/ when a regular noun ends in a sibilant,

giving /iz/ in a word finally example.

Bush + es / /

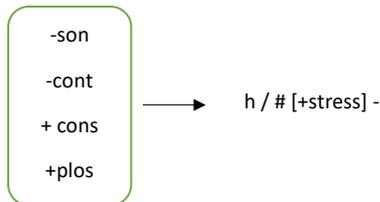
Church + es / /

/i/ [ + sibilant ] - /z/ #





- iii. P-rules add new features or segments for example aspiration. Aspiration rule states that aspirate voiceless plosive (p, t, k) if it occurs at word initial of stressed syllable.  
 /p/ → p<sup>h</sup> / # [+stress] for instance, [p<sup>h</sup>ɪn]

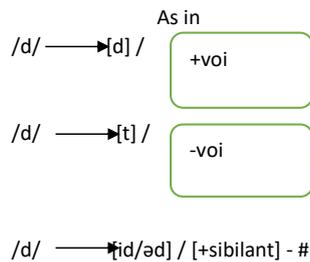


- iv. P-rules permute, interchange or order segments, as seen in metathesis rule. Some sounds modified by the environment in which they occur.

For instance, '-ed' is realised as /d/ after voiced sound except /d/

'-ed' is realised as /t/ after voiceless sound except /t/

'-ed' is realised as /ɪd/ or /əd/ after sibilants



#### 4.0 Self-Assessment Exercise (SAE)

As we conclude this unit, we shall draw your attention to the following self-assessment exercises:

- i. With examples, explain the terms
  - (a) Underlying Representation
  - (b) Phonetic Representation
- ii. What is generative phonology?
- iii. State and formalise deletion rules
- iv. Discuss the components of generative phonology

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## 5.0 SUMMARY

This unit has traced the development of Generative Phonology. It also explained the basic tenets of the theory. In addition to that, Generative Phonology strives to identify what languages have in common. It concentrates on how the sounds of a language are patterned.

## 6.0 TUTOR MARKED ASSIGNMENT (TMA)

- i. Trace the origin of Generative Phonology
- ii. With examples, discuss the levels of representation
- iii. Identify and discuss functions of phonological rules
- iv. Discuss relationship between input and output
- v. Generative Phonology is sufficient to account for segmental and suprasegmental features. Discuss.

## 7.0 REFERENCES/FURTHER READING

- Chomsky, N. & Morris H. (1968). *The Sound Pattern of English*, New York: Harper & Row
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- Fromkin, V & Rodaman, R. (1978). *An Introduction to Language*, London: Holt, Rinehart and Winston.
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## MODULE 3: GENERATIVE PHONOLOGY II

### Unit 2: Extending the frontiers of Generative Phonology

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Phonological rules
  - 3.2 Extending the frontiers of generative phonology
- 4.0 Self-Assessment Exercise (SAE)
- 5.0 Summary
- 6.0 References/Further Reading

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#### 1.0 INTRODUCTION

Generative phonology is a component of generative grammar that assigns the correct phonetic representations to utterances in such a way as to reflect a native speaker's internalized spoken version. Noam Chomsky and Morris Halle founded the generative school phonology and the principles of this school of thought were made prominent in Chomsky and Halle's (1968) 'The sound pattern of English (SPE)'. Generative phonology concerns itself with the principles that guide the pronunciation of words, segments, phrases and even sentences on how they are derived from more general principles, which are operative in all languages.

#### 2.0 OBJECTIVES

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

- i. identify phonological rules that generative phonology fails to account for
- ii. identify the features of the phonological rules that generative phonology did not account for.

#### 3.0 MAIN CONTENT

##### 3.1 Phonological rules

Phonological rules map underlying representation into surface representation. They delete, insert, or change segments or change the features of segments. Phonological rules commence with the underlying representation of a sound (i.e. the phoneme that is stored in the mind of the speaker) and yield the final surface form (i.e. what the speaker, actually pronounces). The underlying form can have multiple surface forms referred to as allophone. For example, plural written as -s may be pronounced as [s] in cats [z] in cabs, [əz] in buses) are all theorized to be stored mentally as the same -s but the surface pronunciations are derived through a phonological rule.

### 3.2 Extending the frontiers of generative phonology

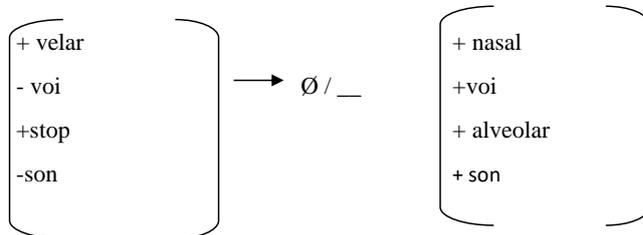
Generative phonologists tried as much as possible to account for the rules as regards what happens to phonemes during speech production. However, in the course of our research, it became evident that there are still some rules that were not accounted for in the deletion rule, feature changing and insertion rule by the generative phonologists.

1. /k/ should be deleted if it occurs before the nasal sound /n/ in words initial position.

Example: knot, knife, knight, kneel

#### Rule formalization

/k/ → Ø / \_\_ /n/

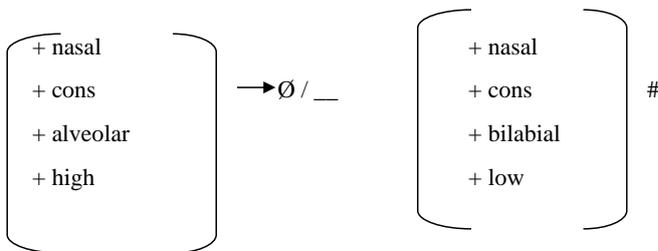


2. Delete /n/ when it comes after the bilabial nasal sound /m/ in word final position.

Examples: hymn, solemn, column, goddamn

#### Rule formalization

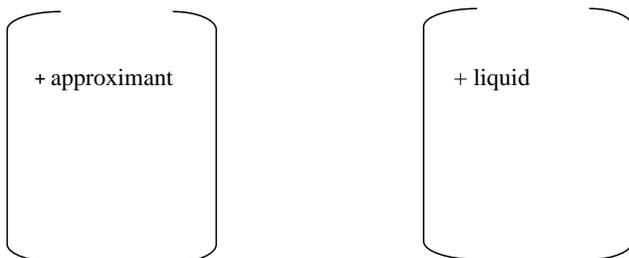
/n/ → Ø / \_\_ /m/ #



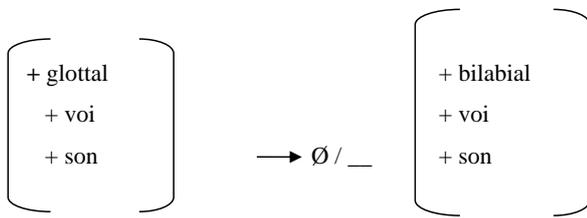
3. Delete /w/ when it comes before /r/ in word initially

Examples: wrath, wretched, wrist, wreck

W → Ø / \_\_ /r/

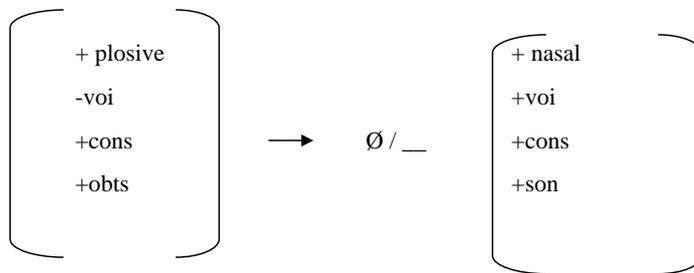






7. /p/ becomes deleted in the environment before a nasal sound. Example: *pneumonia*

/p/ → Ø / \_\_ [+ nasal]



### 5.0 Self-Assessment Exercise (SAE)

Commented [u28]: See comment above

We will round this Unit by drawing your attention to the following self-assessment exercises:

- i. With illustration, account for why generative phonology fails to account for all phonological rules.
- ii. With examples, identify phonological rules that generative phonology did not originally account for.

### 5.0 Summary

The Unit has provided insights into phonological rules that generative phonology did not account for when it was first propounded and developed as a theory. However, though generative phonology fails to account for some phonemes, knowledge of the generative phonology helps in providing insights to the phonemes that were not accounted for. One can identify from the above discussion that phonological rules are formal descriptions whereby phonological processes are systematically expressed. It is a formal way of stating the condition(s) under which phonological processes take place.

### 6.0 References/Further Reading

- Chomsky, N. & Halle, M. (1968). *The sound patterns of English*. New York: Harper & Row
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Goldsmith, J. A. (1995). Phonological theory in *The handbook of phonological theory* (Goldsmith, J. A. Ed). Blackwell band books in Linguistics: Blackwell Publishers.

Okeke, G. T. (2016). Generative Phonology in *Theories of Linguistics* (Mbah, B. M. Ed). Nsukka University of Nigeria Press Ltd.

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## MODULE 3: GENERATIVE PHONOLOGY III

Unit 1: Generative phonology: overview, phonological rules and feature descriptions

Unit 2: Extending the frontiers of Generative Phonology

Unit 3: Suprasegmental features in generative phonology

### UNIT 3: Suprasegmental features in generative phonology

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Stress in Generative Phonology

3.2 Main Stress Rule

3.3 Nuclear Stress Rule

3.4 Stress in Compounds

4.0 Self-Assessment Exercise (SAE)

5.0 Summary

6.0 Tutor Marked Assignment (TMA)

7.0 References/Further Reading

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#### 1.0 Introduction

#### 2.0 Objectives

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

- i. discuss how generative phonology accounts for stress
- ii. identify exceptional cases

#### 3.0 MAIN CONTENTS

##### 3.1 Stress in Generative Phonology

Generative Phonology (GP) is a theory of phonology that uses a set of rules to derive phonetic representations from abstract underlying forms. Generative phonology is a component of generative grammar that assigns the correct phonetic representations to utterances in such a way as to reflect a native speaker's internalized grammar. Generative phonology as presented in *Sound Patterns of English (SPE)* is a rule-based phonology launched by Chomsky and Halle (1968) which is not a total rejection of the classical phonemic theory that preceded it. The GP stands firmly on the foundations built by its predecessor. Both assume the need for a phonetic representation in terms of strings of segment, which abstracted away the linguistically irrelevant properties of speech. Both premised a more abstract representation, namely, a phonemic, in order to capture the regularities of phonetic representations; and both attempt to encode certain kinds of morphological information, required by the phonological rules, in terms of juncture symbols like + and #.

The principal difference between the two approaches lay in the answer to the question. What are the levels of representations in phonological theory? The answer that classical phonemic theory yielded was that there are three levels: phonetic, phonemic and morphophonemic. Generative phonology abandons the intermediate level, its (systematic) phonemic level, approximating the morphophonemic level of the earlier theory. Various definitions have been offered for the word 'stress' as a linguistic feature. Stress concerns the "prominence" given to a syllable of an utterance relative to the other syllables in the utterance. The prominence may be marked by higher intensity (loudness), increased fundamental frequency (pitch) length, etc. occasioned by some organs or features. It is a certain syllable uttered with great energy such that air is ejected from the lungs with more effort. The total effect is that the stressed syllable seems, louder than the others. There are three recognized levels of stress. The first is often called the main stress (which is the highest) the second level is the secondary stress and third (which is the least prominent) is called the tertiary stress.

Although a few traditional phonologists have argued on the difficulties of configuring rules of stress marking, modern phonologists have since proved that it is indeed possible to have rules of stress markings. This has been the engagements of the generative phonologists such as Chomsky and Halle (1968).

Generative phonology is rule based, which accounted for segmental and super segmental features only, it does not account for super segmental feature in connected speech. There are three major stress rules in generative phonology namely: main stress rule (MSR), nuclear stress rule (NSR) and compound stress rule (CSR).

### 3.2 Main Stress Rule (MSR)

#### A. Stress Placement in Verbs – A First Approximation

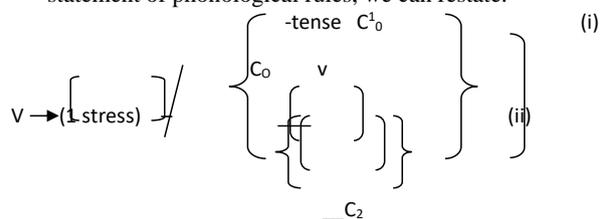
Consider the stress assignment in the following list of verbs

i	ii	iii
astonish	maintain	collapse
edit	erase	torment
consider	carouse	exhaust
ima'gine	appe'ar	ele'ct
int'erpret	cajo'le	convin'ce
p'romise	surmi'se	usu'rp
emba'rass	deci'de	obse'rve
elicit	devo'te	cavo'rt
dete'rmine	achie've	lame'nt
ca'nce	caree'n	ada'pt

The verbs in column "i" have main stress on the penultimate vowel, whereas in columns ii and iii stress falls on the final vowel. A closer examination of the list shows that the verbs with penultimate stress end in a non-tense vowel followed by single consonant, while the verbs with final stress have a tense vowel or a diphthong in the last syllable (column ii) or they end in two consonants (Column iii). To account for the observed stress distribution, we propose as a first approximation, the following rule:

Assign main stress to:

- i. The penultimate vowel if the last vowel in the string under consideration is non-tense and is followed by no more than a single consonant.
- ii. The last vowel in the string under consideration if this vowel is tense or if it is followed by more than one consonant. Using the customary formalism for the statement of phonological rules, we can restate.



We tentatively refer to a string of the form  $\left[ \begin{matrix} - \text{tense } C_0^1 \\ V \end{matrix} \right]$  as a "weak cluster", and a string of the form  $\left[ \begin{matrix} + \text{tense } C_0 \\ V \end{matrix} \right]$

Or

VC<sub>2</sub> as a strong cluster" Eg asto'nish, con'sider, el'ect, tor'ment.

Every rule has its flaw therefore it is significant to identify that this rule for stress placement in verbs does not apply to all verbs in the English language, e.g., 'supplicate, communicate, 'inculcate, et cetera.

Commented [u31]: So, where is the stress placed here?

### B. Stress Placements in Disyllabic Nouns

The GP stress is sensitive to syllable structure two syllable nouns favour initial stress when the ultimate syllable is an open syllable, and final stress when the ultimate (final) syllable is a checked/dosed syllable. This rule is however subject to other rules. Generally, the observed GP stress pattern of disyllabic nouns can be captured in the following rules.

- i. (+voc) → (+ stress) /  $\left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$   
CV# (syllable structure sensitivity)

E.g. CA<sup>noe</sup>, E<sup>va</sup>, HO<sup>nda</sup>, MO<sup>ther</sup>, NU<sup>mber</sup>, O<sup>mo</sup>, PA<sup>per</sup>, SO<sup>da</sup>, TA<sup>llor</sup>, Ze<sup>ro</sup>, but  
 bri<sup>TAIN</sup>, Cra<sup>yFISH</sup>, de<sup>tTOL</sup>, ex<sup>CUSE</sup>, fi<sup>nance</sup>, ma<sup>ttr</sup>ess, pla<sup>ntain</sup>, re<sup>SEARCH</sup>,  
 sa<sup>LAD</sup> and ma<sup>DAM</sup>.

**Commented [u32]:** Where the stress placement in these words?

Note that, it is significant to identify that this rule for stress placement in disyllabic nouns does not apply to all the disyllabic nouns in the English language, e.g., *\infant*, *\tempest*, *\stipend*, *\lantern*, *\mattress*, etc.

### C. Stress Patterns in the Noun/Verb Alternation Rule (NVA)

In the application of this rule, words which have a nominal form and a verbal form are stressed initially in their nominal form.

(+ voc)  $\rightarrow$  (stress) / C – CVC<sub>N</sub> CVC – C<sub>V</sub> (Noun) Verb Alternation

E.g. CON<sup>sent</sup> (con<sup>SENT</sup> – V), CON<sup>straint</sup> (co<sup>STRAIN</sup> – V), COM<sup>plaint</sup> (com<sup>PLAIN</sup> – V), SUC<sup>cess</sup> (suc<sup>CEED</sup> – V) and EXT<sup>ent</sup> (ex<sup>TEND</sup> – V)

### D. Stress Patterns in Diphthongs

This refers to the Generative Phonology subject to stress the syllables with diphthong rhymes irrespective of the position within the word.

**Commented [u33]:** This appears to be handing.

[ ] [ ]  
 + tense  $\rightarrow$  + stress (Diphthong Stressing)

E.g. *bar<sup>RIER</sup>*, *ju<sup>LY</sup>*, *IZ<sup>al</sup>*, *TI<sup>ger</sup>*, *ca<sup>REER</sup>*, *pan<sup>CAKE</sup>* and *mi<sup>GRIANE</sup>*.

**Main Stress Rule** assigns primary stress to the final vowel of the word. For example, vade, supreme – exist absurd, all of which end in a strong cluster. If a verb or adjective has a final weak cluster, the stress is placed on the penultimate syllable e.g. relish, covet, develop stolid, common, clandestine.

V (1 stress) / X – (O) NAV

### 3.3. Nuclear Stress

When no expressive stress disturbs a sequence of heavy stress, the last heavy stress in an intonation unit receives the nuclear stress. Thus, in a noun phrase such as “absolute equality” or a verb phrase such as “demand capitulation”, the main stress of the second word is heavier than that of the first. The rule will be stated as:

C  $\rightarrow$  (1 stress) / (# # (1 stress) Y # #)

Its effect is to reserve secondary stress for phrases that contain more than one words and it assigns primary stress to the right – most seniority peak to the string under consideration.

### 3.4 Stress in Compounds

- 1) Assign primary stress to the first of the two peaks, reducing all other stress levels by one. Examples of compound words: Chemistry-laboratory, sugar-cane, Christmas party etc.

V → (1 stress) / (# # X (1 stress) Y # # Z # #)

This rule will apply to a string of the form # # X V Y # # Z # # which is a noun, adjective or verb with the two immediate constituents XVY and Z. Its effect will be to weaken all stresses in the construction under consideration except that of the primary-stressed vowel of XVY. But this rule for stress placement in compound words does not apply to all compound words e.g., secretary (general, sea'wall, multi'faceted, man'handle, etc.

English is known as a stress-timed language. Stressed languages are languages spoken with differing degrees of emphasis on the words and syllables in the sentence. The generative phonologists have done well by setting these systematic rules for the English language stress pattern.

Although stress and intonation are an important part of English pronunciation, learners must remember that it would be impossible for anyone to speak naturally with a set of rules in mind. By far, the best way to improve one's pronunciation is through constant contact with native speakers of English, either through conversation, by watching films and news channels, or listening to radio and practicing.

#### 6.0 Self-Assessment Exercise (SAE)

We will round off this Unit by asking you to consider the self-assessment exercises below:

- i. How does generative phonology account for stress?
- ii. Are there weaknesses in generative phonology's treatment of stress?

#### 5.0 Summary

- Generative phonology as presented in Sound Patterns of English (SPE) is a rule-based phonology launched by Chomsky & Halle (1968).
- Main Stress Rule (MSR) assigns prominence to the penultimate vowel if the last vowel in the string under consideration is non-tense and is followed by no more than a single consonant.
- Generally, the observe G.P stress pattern of disyllabic nouns can be captured in the following rules.

(+voc) → (+ stress) / {<sup>c</sup> # }

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#### CV# (syllable structure sensitivity)

- Stress Patterns in The Noun/Verb Alternation Rule (NVA): words which have a nominal form and a verbal form are stressed initially in their nominal form.
- Main Stress Rule assigns primary stress to the final vowel of the word.
- Nuclear Stress: its effect is to reserve secondary stress for phrases that contain more than one words and it assigns primary stress to the right – most seniority peak to the string under consideration.
- Stress in Compounds assigns primary stress to the first of the two peaks, reducing all other stress levels by one.

#### 6.0 Tutor Marked Assignment (TMA)

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#### 7.0 References/Further Reading

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## Unit 3: Optimality theory and suprasegmental features (2)

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### Content

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Syllable
  - 3.2 Mora
  - 3.3 Syllable related constraints
  - 3.4 Examples of syllabic patterns in optimality theory
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor Marked Assignment
- 7.0 References/Further Reading

### 1.0 INTRODUCTION

Optimality Theory is a linguistic theory, which states that forms of language reflect resolutions of conflicts among competing constraints. These constraints are specific restrictions on the form (s) of a structure. According to Kager (1999), every language (grammar) is a system of “conflicting forces” known as constraints. These constraints compete for satisfaction as they make demands concerning some aspect of grammatical output forms. Constraints are “conflicting” because the satisfaction of one entails violation of another. Since no form can satisfy all constraints at the same time, the mechanism of constraint ranking is used to select forms that incur “lesser” constraint violations from others that incur “more serious” (“fatal”) ones. This is done through hierarchical ranking of constraints such that higher-ranked constraints have priority over lower-ranked ones. It is widely held that constraints are universal, whereas the rankings are language-particular (specific). That is, each language has its own constraint ranking.

### 2.0 OBJECTIVES

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

- Describe how optimality theory treats suprasegmental features
- Describe syllable and how optimality theory accounts for it

### 3.0 MAIN CONTENT

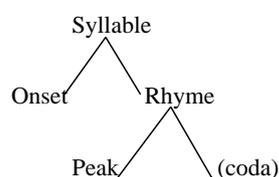
#### 3.1 Syllable

The centrality of the syllable to the discussion of stress is unarguable because all words are composed of syllables, which in standard usage is called Syllabic Licensing (Hammond, 1997:35). Vowels and consonants make up the sound units of a language. Since speech is a continuous thing, a speaker produces a chain of vowels and consonants, which combine to form

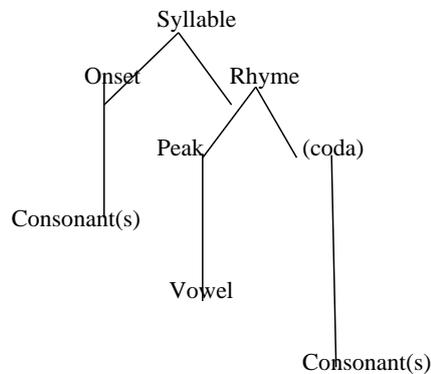
a larger unit. This unit is called syllable. A syllable is the smallest unit of sound that is pronounceable as a breath's effort. Roach (2000:70) describes a syllable 'as consisting of a centre which has little or no obstruction to the airflow and which sounds comparatively loud; before and after this centre...there will be greater obstruction to airflow and /or less loud sounds.' Hammond (1999:35) opines that a syllable is constituent of vowel and consonant sounds grouped into peak of sonority or intrinsic loudness. It implies that the structure of a syllable will move from the least sonorous to the most sonorous (usually the vowel that will constitute the peak of the syllable); and then move down in sonority. A syllable is made-up of segments with high sonority flanked by segments of low sonority. It is a cluster of sonority, where the element of peak sonority attracts and surrounds itself with segments of lower sonority (Oyemade, 2019).

In addition to that, a syllable is a segment of speech that consists of a vowel, with or without one or more accompanying consonant sound(s), which precede(s) or follow(s) it. Akere (1987:16) says; the syllable serves as the locus of operation for supra segmental (prosodic) features. It can also be defined as consonants and vowels grouped into peaks of sonority or intrinsic loudness.

Syllable structure refers to the manner in which vowels and consonants may come together to form a syllable or a word. The syllable has a three-part structure. The structure of the English syllable has been stratified to include the Onset, the Peak/Nucleus and the Coda. Roach (1997:73) represents this on a tree diagram thus:



However, this can be re-represented thus



The analysis above has been termed a more refined analysis of syllable, which combines both the vowel (peak) and the coda (final consonant) as rhyme. The rhyme is divided into an obligatory peak and an optional coda. For example; Go-(with peak and without coda), Gone- (with both).

The elements in the structure of the syllable in English can be represented as  $(C^{0-3}) V (C^{0-4})$ . This suggests that we have consonant clusters in a language like English, whereas some other languages (like Yoruba) do not have. The basic elements of the syllable are the onset, peak/nucleus and coda.

$C^{0-3}$  = Onset (initial periphery of the syllable)

V = Peak (nucleus (syllable nucleus))

$C^{0-4}$  = Coda (final periphery of the syllable)

**Onset:** The onset is the initial periphery of the syllable. It usually contains one or more consonants. In other words, where one or more consonants appear(s) before a vowel sound in a word, the consonant is called the onset. For example, one consonant onset: **g**o, **t**old, **f**ell, **m**et, **b**ut; two consonants onset: **bl**ow, **br**ought, **pl**ease; three consonants onset: **sp**ring, **st**rength.

**Peak/Nucleus:** This is otherwise known as the rhyme. It consists of the vowel, which is obligatory in a word. For example, *go*, *met*, *fell*, *flow*, *spring*, *gone*.

**Coda:** The coda is the final periphery of the syllable. It usually contains one or more consonants. In other words, where one or more consonant(s) appear(s) after a sound in a word, the consonant is called the coda. For example, one consonant coda: *fell*, *met*, *but*, *please*; two consonants coda: *told*, *find*, *mould*; three consonants coda: *pumped*, *spends*; four consonants coda: *sculpts*, *strengths*.

### 3.2 Mora

A mora is an abstract length unit and is used to show the weight of a syllable. It is the weight-bearing unit in a syllable (Frid, 2001:26). The number of moras in a syllable can determine the weight of a syllable, either as heavy or light. A syllable can have two moras when it has a coda or contains a long vowel or diphthong. Not all coda consonants are however moraic. A coda consonant is weight-bearing when it is flanked on the right by another consonant. For instance, in *common*, the coda consonant of the last syllable will not be considered heavy enough to project a mora because it is not immediately followed by another consonant. However, in *protest*, the coda of the second syllable is heavy because there are adjacent consonants there.

### 3.3 Syllable-related constraints

Under the assumption that words are composed of syllables, the linguist characterizes possible syllables, rather than possible words, both universally and for a given language. Typical properties of syllable/constraints:

- |  |         |
|--|---------|
| a) Syllables begin with a consonant                | ONSET   |
| b) Syllables have one vowel                        | PEAK    |
| c) Syllables end with a vowel                      | NOCODA  |
| d) Syllables have at most one consonant at an edge | COMPLEX |

- e) Pronounce everything in syllable as it is FAITHFULNESS
- f) Vowels in the input must be maximally represented in the output FAITHV
- g) Consonants in the input must be maximally represented in the output FAITHC
- h) Every element in the input must have corresponding output. There should be no deletion  
MAX
- i). Every element in the output must have a corresponding segment in the input. On no account should there be insertion DEP-IO
- j). Adjacent vowels must have the same features HIATUS
- k). There should be three consonant cluster TRI(C)
- l). There should be no coda in the first syllable F<sup>NOCODA</sup>
- m). Initial plosive should be aspirated ASP

The violation of any of the above constraints, which has to do with the structure of the syllable, is a fatal violation. This is because markedness, which is the highest ranked constraint, has to do with structure. The constraints are however general tendencies and not absolute laws. Thus, there are syllables in the language which violate some of these properties, a point that optimality theory will exploit in some English words.

### 3.4 Examples of syllabic patterns in OT

1. The word: *Teacher*

Input: /ti:tfə/ → Output: /ti:ʃə/

Candidates	*NOCODA	FAITHV	FAITHC
☞ ti:tfə			
ti:ʃe	*!	*	*
ti:ʃə	*!	*	*

Constraint ranking: \*NOCODA >> FAITHV >> FAITHC

In the example above, three candidates were generated for the input teacher /ti:tfə/ but while candidates B and C fatally violate a constraint (\*NOCODA) and the two other constraints

(FAITHV and FAITHC) respectively, candidate A emerges the optimal candidate indicated with the pointing finger not having violated any of the constraints.

2. The word: *Wardrobe*

Input: /wɔ:.drəub/ → /wɔ:drəub/

Candidates	CV.CCVC	F <sup>NOCODA</sup>	FAITHC
☞ wɔ:.drəub			
Wɔ:d.rəub	*!	*!	
Wɔ:.rəub	*!		*

Constraint ranking: CV.CCVC >> F<sup>NOCODA</sup> >> FAITHC

CV.CCVC is a markedness constraint, representing the syllabic structure of /wɔ:.drəub/ and candidate B and C violate it, leading to fatal violation. Candidate B also violates the F<sup>NOCODA</sup> constraint, which says that the first syllable should end with a vowel leading to fatal violation. FAITHC constraint was also violated by Candidate C leaving the first candidate, which is A as the candidate with no violation and as such the optimal candidate.

3. The word: *Car*

Input:[k<sup>h</sup>a:] → Output:[k<sup>h</sup>a:]

Candidates	CV	ONSET	FAITHV	ASP
[ka:]				*
☞ [k <sup>h</sup> a:]				
[kæt]	*!		*	*
[æt]	*!	*!	*	*

Constraint ranking: CV >> ONSET(C) >> FAITHV >> ASP

In the mono-syllabic word CAR, square bracket is used because phonemic transcription is used for the candidates. All the candidates generated however have fatal violations either by violating the CV constraints, which is the correct syllabic structure of the input or ONSET which says that consonant should begin a syllable. Candidate A however violates the ASP constraints because the /k/ in it is not aspirated as in the input leaving candidate B as the optimal candidate.

#### 4.0 Self-Assessment Exercise (SAE)

We will conclude this unit by asking you to pay close attention to the following self-assessment exercises:

- i. explain syllable and how it is accounted for using optimality theory
- iv. Account for the following lexical items using at least two constraints for each:  
*quality, prominence, English, awesome, ewe*

#### 5.0 SUMMARY

- Syllable is the smallest unit of sound that is pronounceable as a breath's effort.
- Mora is an abstract length unit and is used to show the weight of a syllable. It is the weight-bearing unit in a syllable (Frid, 2001:26).
- Syllable-related constraints explore violable constraints for syllables.

#### 6.0 TUTOR MARKED ASSIGNMENT (TMA)

Itemise and describe at least two theories that can be explore and account for syllable apart from Optimality Theory

#### 7.0 REFERENCES/FURTHER READING

Chomsky, N. & Halle, M. (1968). *The Sound Pattern of English*. New York: Harper and Row.

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Prince, A. & Smolensky, P. (1993). *Optimality Theory; Constraints Interaction in Generative Grammar*. Oxford: Blackwell Publishing.

Uzoagba, O. M. (2016). Optimality Theory. *Theories in linguistics* (pp. 82-90). Nsukka: UNN Press

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## Unit 4: An overview of optimality theory and the handling of stress

### Content

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor Marked Assignment
- 7.0 References/Further Reading

### 1.0 INTRODUCTION

In the previous Unit, we introduced you to the concept of the Optimality Theory and how it accounts for the syllable. In this Unit, we will be considering how Optimality Theory as a theoretical framework can serve as a tool to account for patterns of stress in lexical items. Background knowledge an individual has about a language aids such an individual to arrange appropriate constraints for stress patterns; that is, if one's knowledge about a language is limited, it may affect the generation of ideal constraints for ranking candidate sets.

### 2.0 OBJECTIVES

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

- Explain constraint ranking for stress patterns
- Discuss how to orderly arrange the constraints
- Interpret constraints arranged on the Tableau

### 3.0 MAIN CONTENTS

#### 3.1 Stress

In the English language, stress plays a very prominent role. The experience of the Nigerian learner or user of English, especially in the area of stress, is quite different from that of the native speaker. The difference between the suprasegmental phonology of Nigerian English and that of Standard British English or the Received Pronunciation is remarkable in the area of primary stress assignment. It therefore becomes pertinent to examine what stress is, how it is presented in a word, its features and functions.

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Stress has been described as the prominence, loudness and/or more muscular effort exerted upon a syllable in a word. Roach (2000) considers stress from the point of view of production and perception: production as regards the more muscular energy stressed syllables require; and perception as regards loudness, length, the movement of pitch and the quality of the vowel. Cruttenden (2008:236) notes that 'any of four factors-pitch, loudness, quality and quantity-may help to render a syllable more prominent than its neighbours. But it is principally pitch change which makes an accented syllable'. Stress is described as being dependent on the prominence of the syllables that co-occur in a given word; in other words, stress cannot be in isolation but rather, relational. Stress is used to differentiate the class of a particular word belongs to. It is sometimes also used to lay emphasis on a syllable or word in a sequence. Word-stress pattern as observed by Kager (1999) is typically governed by conflicting forces. A lot of work has been done in Metrical Phonology where stress is identified as a rhythmic phenomenon of strong-weak relationship between syllables. Metrical phonology shows how stress is assigned by using the metrical tree and grid to illustrate foot parsing, culmination of stress and the alternation of strong and weak syllables in a language like English. Stress in English is phonemic, that is, it can perform the grammatical function, of changing the meaning and consequently, the class of a word.

### **3.2 Optimality Theory**

Optimality Theory (OT), which is a linguistic theory developed from Generative Grammar, is a modern approach to phonological analysis that has taken the lead world over (Uzoagba, 2016). Unlike the previous approaches to phonological analysis, which were rule-based, the theory is constraint-based as it describes languages based on constraints interactions. It provides mappings from input (underlying representations) to output (surface realizations) (Optimality Theory, n.d.). It was introduced to remedy the shortfalls of the rule-based framework, which had been widely in use in the 20th century. The rule-based approaches, such

as Chomsky's *Sound Pattern of English*, John Goldsmith's auto-segmental phonology as well as Liberman's metrical phonology, each solved peculiar problems but none of them described language as a set of constraints. They were based on a "derivation of three things: an underlying representation, a surface representation and a set of rules that connect them" (Uzoagba, 2016). The introduction of a new approach (OT) by Alan Prince and Paul Smolensky in their talk in 1991, and presented in a manuscript titled *Optimality Theory: Constraint interactions in generative grammar* (1993), (Nordquist, 2009) changed the narrative in the field of linguistics as we now know it.

Optimality theory is a theory that describes both segmental phonology and suprasegmental or prosodic phonology. In essence, it handles rhythm, syllable, stress as well as intonation. Of course, it first held sway in phonology, but currently its principles have been employed in other linguistic fields (Uzoagba, 2016; Sunday & Oyatokun, 2016; Nordquist, 2009). Hence, any language can adopt the theory not only in phonology, but also in morphology, syntax, semantics, sociolinguistics, pragmatics and historical linguistics. Our focus in this Unit is on OT and the way it handles stress in the English language.

In describing how constraints interact and dominate one another, Prince and Smolensky (2004) argue that constraints which operate in a given language are always in conflict and make "sharply contrary claims about the well-formedness of most representations". The constraints and the mechanisms for resolving them are contained in the grammar of a language. To determine which analysis of a given input best satisfies a set of consistent well-formedness conditions, OT relies on the notion of constraint interaction whereby the satisfaction of one takes absolute priority over the satisfaction of another. In other words, a grammar uses ranking of constraints in a "strict domination hierarchy" to resolve the conflicts. Constraints are ranked from left to right (highest to lowest). According to McCarthy (1993:6), "The central analytical proposal of Optimality Theory is that constraints are ranked in a hierarchy of relevance. Lower-

ranked constraints can be violated in an optimal output form to secure success on higher-ranked constraints”.

### 3.2.1 Mechanisms in Optimality Theory

There are three main mechanisms in OT. These are GEN, CON and EVAL.

**GEN:** this is the abridged form of generator. It generates candidates for comparison. “Candidates” are a universal set of output forms for a given input and specifies the relation between the input forms and the output (Uzoagba, 2016; Sunday & Oyatokun, 2016).

**CON:** stands for constraints. It is the universal set of violable constraints, which are contained in the grammar of every language. There are three types of constraints, namely faithfulness constraint, markedness constraint and alignment constraint (Uzoagba, 2016). The first two are major families of constraints (Sunday & Oyatokun, 2016; Nordquist, 2019), while the third is not so pronounced. **Faithfulness constraints** are conservative (Uzoagba, 2016): they require identity between the input and output forms. That is, the observed surface form should march the underlying form in some certain way (Nordquist, 2019; Optimality Theory, n.d.). To be in harmony with the faithfulness constraints, the “output segments must have counterparts in the input”. Both output and input must share values for voicing. This means “there should be no elision, metathesis, epenthesis or even assimilation” (Uzoagba, 2016). Thus, faithfulness constraints resist changes to input structures. Uzoagba observes that they are often in constant conflict with markedness constraints, which rather favour some linguistic structures over others. The conflict is usually resolved with constraint ranking. **Markedness constraints** impose requirements on the structural well-formedness of the output. They are only concerned with the output forms. They may be positively or negatively influenced. They usually conflict with faithfulness constraints. **Alignment constraint** are not widely discussed. Prince and Smolensky (as cited in Uzoagba, 2016), suggested that Lardil forms like /kaʷ/ can augment to

/ka<sup>h</sup>ka/ to achieve a minimal size while aligning the stem, that is, root + suffixes with a syllable boundary.

**EVAL:** EVAL evaluates in parallel the set of output candidates with regard to the “language-particular hierarchy” and determines the output form that is optimal (Sunday & Oyatokun, 2016). The performance of a candidate determines its selection. The evaluator “consists of sets of ordered constraints (B1 >> B2 >> B3, etc.) which evaluate the candidates with regard to their harmony values” – the extent of their compliance with the constraints (Uzoagba, 2016).

### 3.2.2 Terms in the OT Schema

The following are also associated terms used in the OT schema:

**Input (lexicon):** The lexicon contains the lexical representation (underlying forms) supplied to the generator. Input refers to the raw material used in OT at the underlying structure (Uzoagba, 2016). OT holds that there are no specific restrictions on the input. This is called “richness of the base” (Optimality Theory, n.d.). Every possible input can be handled by any grammar.

**Output:** whereas input functions at the underlying structure, output refers to the possible outcome at the surface structure.

**Candidates:** this presupposes the idea of competitors or contestants in a competition. Candidates are output forms generated by the GEN for analysis at a given time. “A set of candidates is generated based on a given input (underlying form)” and each is assessed based on faithfulness (Uzoagba, 2016). From among all the candidates there will emerge an optimal candidate, which satisfies a set of ranked constraints.

**The Constraint Tableau:** is a pictorial presentation of OT analysis of constraints. It displays the possible outputs generated by GEN and arranged in vertical columns whilst constraints are

displayed in horizontal columns (Sunday & Oyatokun, 2016). Ranking is shown in the tableau using continuous unbroken vertical lines between the columns of the relevant constraints. Where constraints are not ranked, this is represented with dotted lines on the tableau to show that such constraints are mutually unranked. Any violation of a higher-ranked constraint is regarded as fatal (serious) violation, needing no further evaluation. The candidate fields for the lower-ranked constraints are shaded. The candidate that incurs the least violation of higher-ranked constraints is considered the winner.

### **3.2.3 Symbols Used in the OT Tableau**

The following are symbols used in the OT tableau and their interpretations:

☞ The pointing finger identifies the optimal (winning) candidate at the output level.

\*! The asterisk and exclamation mark indicate a fatal violation by a candidate. Any candidate that incurs a fatal violation cannot emerge the winner.

\*The asterisk: indicates a violation.

>> used to indicate domination in constraint ranking.

“,” indicates mutually unranked constraints.

### **3.3 Stress-related constraints**

Word stress in OT is analyzed using concepts borrowed from Metrical Phonology. Tesar, and Frid, (as cited in Sunday & Oyatokun, 2016) state that OT borrows the idea of metrical relations which assigns stress to the syllable that is heaviest. The relational concept is in the prominence (weight) of a syllable in relation to another adjacent syllable that is not prominent. In other words, the syllables are arranged in twos of one stressed syllable and one unstressed. It is such pattern of alternation that is regarded as metrical foot.

The set of constraints in OT is universal; languages can only differ in terms of their constraint rankings. Every ranking permutation is, in principle, predicted to be a possible language. These are some of the most generalized stress related constraints. The first is the constraint that requires that words get at least one stress. In OT terms, this is usually done with  $L_X W_D = P_R W_D$ , which requires that content words be prosodic words, where prosodic words must include at least one foot. According to Sunday and Oyatokun (2016), the following have been identified:

- a. **ROOTING:** (The root of) Content words must be stressed.
- b. **FIT-BIN:** this indicates that feet are binary at some level of analysis (moraic or syllabic). The constraint requires either that a foot contains two moras ( $\mu\mu$ ) as in monosyllabic (H) and disyllabic (LL); or two syllables ( $\sigma\sigma$ ), regardless of their weight.
- c. **PERSE-SYL or PSYLL** (Markedness constraint): Two unfooted syllables cannot be adjacent. This is called weak layering and means that no syllable is allowed to be in isolation. Syllables must be parsed by foot (footed). It makes for syllable well-formedness.
- d. **ALIGN-L or ALL FT LEFT:** Align (Ft, Left, Pr Wd, Left): Every foot must stand at the left of the Pr Wd. This constraint demands that the left edge of every foot must tally with the left edge of every prosodic word. It is also a markedness constraint.
- e. **TROCHEE or Ft-Type TROC:** is a faithfulness constraint. It assigns one violation mark for every foot that is not left-headed.
- f. **WEIGHT-TO-STRESS PRINCIPLE (WSP):** This constraint assigns one violation mark for every heavy syllable that is unstressed.
- g. **NONINITIALITY (NON-INI):** assigns one violation mark for every foot that is word-initial.
- h. **\*CSR:** assigns one violation mark for every instance of a schwa /ə/ between a consonant and a retroflex /r/.

i. **CLASH:** this forbids adjacent stressed syllables. This constraint ensures that there are no clashes among the stressed syllables and one violation mark is assigned for every pair of consecutive stressed syllable.

j. **IAMB:** assign one violation mark for every foot that is not right-headed (Prince & Smolensky, 1993; McCarthy & Prince, 1993).

**3.4 The following are typical examples of stress patterns using OT:**

Tableau 1: stress patterns for *Sunday*

Input /'sʌn.dei/ → Output /'sʌn.dei/

Candidates	WSP	ROOT	TROCH	NON-INI
sʌn.'dei	*!	*!	*	
<sup>ɛʃ</sup> 'sʌn.dei				*

Constraint ranking: **WSP >> ROOT >> TROC >> NON-INI**

Optimal candidate: <sup>ɛʃ</sup> /'sʌn.dei/

WSP and ROOT are highest-ranked constraints, their violations by candidate 1 are considered fatal. Candidate 2 emerged the optimal candidate for satisfying the high-ranked constraints, though it violated a constraint (NON-INI) which is lower-ranked.

Tableau 2: stress patterns for *inform*

Input /in.'fɔ:m/ → /in.'fɔ:m/

Candidates	WSP	ROOT	TROCH
'in.fɔm	*!	*!	
<sup>ɛʃ</sup> in.'fɔ:m			*

Constraint ranking: **WSP >> ROOT >> TROC**

Optimal candidate:  $\text{ɪ}^{\text{F}}$  /in.'fɔ:m/

Candidate 1 violated higher-ranked constraints seriously. Candidate 2 emerged because it is harmonic having satisfied the dominant constraints though it violated a constraint which is demoted to satisfy the higher-ranked constraints.

Tableau 3: stress patterns for *educate*

Input: /'e.dʒu.keɪt/  $\longrightarrow$  /'e.dʒu.keɪt/

Candidates	WSP	PSYLL	NON-INI
$\text{ɪ}^{\text{F}}$ 'e.dʒu.keɪt			*
e.dʒu.'keɪt	*!	*	
e.'dʒu.keɪt	*!	*!	

Constraint ranking: WSP >> PSYLL >> NON-INI

Optimal candidate:  $\text{ɪ}^{\text{F}}$  'e.dʒu.keɪt

Candidate 1 is more harmonic, having satisfied high-ranked constraints but committed minimal violation. Thus, it emerged the optimal candidate, whereas candidates 2 and 3 lost because they committed fatal violations.

#### 4.0 Conclusion/Self-Assessment Exercise (SAE)

We will conclude this section by asking you to pay attention to the following self-assessment exercises:

1. Use stress-related constraints to account for the following lexical items

faculty  
commissioner  
suggestion  
university  
referee

2. Generate five constraints for compounds

**Commented [u40]:** This should be integrated in each subsection for students to self-assess their understanding of each subsection the questions deal with.

3. Use the constraints that you generated for question 2 to account for: *air conditioner, hand set, face cap, textbook, blackboard*

## 5.0 SUMMARY

Optimality Theory (OT), introduced by Alan Prince and Paul Smolensky as a new approach to phonological analysis; it is a constraint-based theory. This differentiates it from previous approaches. At the heart of OT lies the ranking of universal constraints according to their hierarchy of relevance in order to resolve conflicts arising from sharply contrasting demands of universal constraints on linguistic forms. In the process, we have examined the applicability of this theory to stress pattern of English lexical items.

## 6.0 Tutor Marked Assignment

## 7.0 References/Further Reading

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## Unit 5: Optimality theory and constraints

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Contents
  - 3.1 Optimality theory
  - 3.2 Constraints
    - 3.2.1 Constraints for syllables
    - 3.2.2 Constraints for stress patterns
    - 3.2.3 Constraints for phrasal stress
- 4.0 Self-Assessment Exercises (SAE)
- 5.0 Summary
- 6.0 Tutor Marked Assignment (TMA)
- 7.0 References/Further Reading

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### 1.0 Introduction

Optimality theory as a theoretical framework is useful for providing insights into the segmental and suprasegmental features of phonological data.

### 2.0 Objectives

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

- Identify different constraints of optimality theory
- Apply constraints of optimality theory to account for segmental and suprasegmental features
- Explain the constraints
- Differentiate constraint families of optimality theory

### 3.0 Main Content

#### 1.1 Optimality theory

Optimality theory (OT) is a constraint-based theory of phonology that analyzes the phonologies of particular languages in terms of a single set of typologically well-founded well-formedness conditions. It incorporates markedness theory directly into phonological derivations in a computational component called EVAL, which allows only the least-marked structures to make it to the surface. Standard OT is based on three principles. However, it is important to identify that OT has principles, which include that (i) constraints are violable, but violation is minimal; (ii) constraints are ranked on a language-particular basis; (iii) and the constraint hierarchy evaluates a set of candidate analyses that are admitted by very general considerations of structural well-formedness. The identified principles aid constraint interactions and rankings in OT.

#### 3.2 Constraints

Unlike generative phonology that is rule based, OT is a constraint-based theory and the heart of OT is the idea of universal constraints, which are nevertheless violable. By being universal,

the constraints themselves provide an explicit means of characterizing the cross-linguistic similarities that exist. By being violable, there is a means of expressing language variation: the degrees of violation tolerated for each constraint are unique to each language. That is why OT proposes a single means of expressing which constraints are violable, namely constraint ranking-violations of lower-ranked constraints, which are tolerated in order to satisfy higher-ranked constraints.

### 3.2.1 Constraints for segmental features

Constraints that are relevant for the analysis of segmental features are highlighted and discussed below:

S/N	Constraints	Explanations
i	<b>C<sup>3</sup></b>	assigns one violation mark for candidates/forms that have less or more than three consonants (triconsonant).
ii	<b>C<sup>2</sup></b>	assigns violation to candidate(s) that has less or more than two consonants.
iii	<b>Ident-F-Plo</b>	means that any phoneme at the word final that is not plosive incurs violation
iv	<b>C<sup>coda</sup></b>	assigns one violation mark for open syllable or syllable that ends with consonant
v	<b>k(m)</b>	assigns violation to velar(k) at the middle
vi	<b>V<sup>coda</sup></b>	assigns violation to voiced phoneme at the coda
vii	<b>C<sup>coda</sup></b>	assigns violation to consonant sound at the coda
viii	<b>ʃ(m)</b>	assigns violation to palate-alveolar at the middle
ix	<b>Dep</b>	assigns violation to candidate/form that bears insertion
x	<b>Complex</b>	assigns violation to candidates that are without consonant clusters
xi	<b>Uniformity</b>	assigns violation to candidate(s) that is different in structure
xii	<b>MAX-IO</b>	Every segment of the input has a correspondent in the output. (No phonological deletion)
xiii	<b>FAITHC</b>	assign violation to any output that does not correspond to input in consonants
xix	<b>FAITH V</b>	assign violation to any output that does not correspond to input in consonants
xx	<b>FAITH (POA)</b>	assign violation to any output that does not correspond to input in Place of articulation
xxi	<b>IDENT (M)</b>	violation to any output that does not correspond to input in manner
xxii	<b>IDENT (P)</b>	assign violation to any output that does not correspond to input in place of articulation

xxiii	<b>IDENT (central)</b>	assign violation to any output that does not correspond to input in central position.
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### 3.2.2 Constraints for syllables

Under the assumption that words are composed of syllables, the linguist characterizes possible syllables, rather than possible words, both universally and for a given language.

Typical properties of syllable/constraints:

S/N	Constraints	Explanations
i	ONSET	Syllables begin with a consonant
ii	PEAK	Syllables have one vowel
iii	NoCODA	Syllables end with a vowel
iv	COMPLEX	Syllables have at most one consonant at an edge
v	FAITHV	Vowels in the input must be maximally represented in the output
vi	FAITHC	Consonants in the input must be maximally represented in the output
vii	MAX	Every element in the input must have corresponding output. There should be no deletion
viii	DEP-IO	Every element in the output must have a corresponding segment in the input. On no account should there be insertion
ix	HIATUS	Adjacent vowels must have the same features
x	TRI(C)	There should be three consonant cluster
xi	Onset <sup>NoCODA</sup>	There should be no coda at the initial syllable
xii	I <sup>ASP</sup>	Initial plosive should be aspirated

The violation of any of the above constraints, which has to do with the structure of the syllable is a fatal violation, as markedness which is the highest ranked constraints has to do with structure. The constraints are, however, general tendencies not absolute laws; thus, there are syllables in language which violate some of these properties.

### 3.2.3 Constraints for stress patterns

According to Sunday and Oyatokun (2016), the following constraints have been identified to account for stress patterns:

- k. **ROOTING:** (The root of) Content words must be stressed.
- l. **FIT-BIN:** this indicates that feet are binary at some level of analysis (moraic or syllabic). The constraint requires either that a foot contains two moras ( $\mu\mu$ ) as

in monosyllabic (H) and disyllabic (LL); or two syllables ( $\sigma \sigma$ ), regardless of their weight.

- m. **PERSE-SYL or PSYLL** (Markedness constraint): Two unfooted syllables cannot be adjacent. This is called weak layering and means that no syllable is allowed to be in isolation. Syllables must be parsed by foot (footed). It makes for syllable well-formedness.
- n. **ALIGN-L or ALL FT LEFT**: Align (Ft, Left, Pr Wd, Left): Every foot must stand at the left of the Pr Wd. This constraint demands that the left edge of every foot must tally with the left edge of every prosodic word. It is also a markedness constraint.
- o. **TROCHEE or Ft-Type troc**: is a faithfulness constraint. It assigns one violation mark for every foot that is not left-headed.
- p. **WEIGHT-TO-STRESS PRINCIPLE (WSP)**: This constraint assigns one violation marks for every heavy syllable that is unstressed.
- q. **NONINITIALITY (NON-INI)**: assigns one violation mark for every foot that is word initial.
- r. **\*CSR**: assigns one violation mark for every instance of a schwa /ə/ between a consonant and a retroflex /r/.
- s. **CLASH**: this forbids adjacent stressed syllables. This constraint ensures that there are no clashes among the stressed syllables and one violation mark is assigned for every pair of consecutive stressed syllable.
- t. **IAMB**: assign one violation mark for every foot that is not right-headed (Prince & Smolensky, 1993; McCarthy & Prince, 1993).

### 3.2.4 Constraints for Phrasal Stress:

S/N	Constraints	Explanations
i	NSR - (Nucleus Stress Rule)	Stress the rightmost elements in phrases (Cruttenden, 1986, p. 31)
ii	LCPR - (Lexical Category Prominence Rule)	Operates on simple and compound words. For any pair of sister nodes $[N_1N_2]$ , if $[N_1N_2] L$ where L is a lexical category; then $N_2$ is strong. For instance, $N_1$ (oil-tanker) in 'oil-tanker' driver, driver is strong since the $N_2$ (driver) does not branch into new words (Lieberman & Prince, 1977, p. 27).
iii	CSR - (Compound Stress Rule)	Stresses the penultimate word in phrasal expressions. CSR applies to both compounds and phrases. For instance, in compounds, if it is a noun, the stress will be on the first syllable while in compound adjectives, adverbs, adjectives and verbs; initial lexical item bears the prominence.
iv	GER (Grid Euphony Rule)	(Grid Euphony Rule): Insists that every strong lexical item should be followed by a weak position and no weak lexical item should be preceded by more than one weak position.

v	ROOTING	Content words must be stressed (Hammond, 1997, p.44; Sunday & Oyatokun, 2016).
vi	TS (Tonic syllable)	Assign stress on the last content word which carries the central proposition of tone unit
vii	PAPR - (Pitch Accent Prominence Rule)	Pitch accent lexical items receive an additional beat to raise its prominence.
viii	HPC (Highest Phrase Condition)	Conditions prominence on the lexical item that has highest proposition in a phrase and compound
ix	TGA(Text-to-Grid)	Alignment relates to the lexical structure either TGA (L), TGA (M) or TGA (R) (Selkirk, 1984).
x	RNR (Right-node-raising)	Stress the lexical item at the right hand of the lexical configurations.
xi	LHR (Left Head Rule)	It emphasises that stress should be at the leftmost
xii	RHR (Right Head Rule)	It emphasises that stress should be at the rightmost.

#### 4.0 Self-Assessment Exercises (SAE)

- i. With adequate examples, describe constraint ranking
- ii. Use constraint ranking for phrasal composition to determine stress in phrases
- iii. Explain five constraints

#### 5.0 Summary

Optimality theory is a constraint-based theory of phonology that analyzes the phonologies of particular languages in terms of a single set of typologically well-founded well-formedness conditions.

OT is a constraint-based theory and the heart of OT is the idea of universal constraints, which are nevertheless violable.

#### 6.0 Tutor Marked Exercise

Account for the optimal candidates using the following words: examiNAtion, disMISS, BABy, GRAMmar, fourTEEN

#### 7.0 Further reading

Anyagwa, C. N. (2014). *Word Stress in Nigerian (Igbo) English*. (Unpublished PhD Dissertation, University of Lagos).

Gut, U. & Milde, ?. (2002). *The Prosody of Nigerian English*. Gut & Gibbon, eds., 167-78.

**Commented [u44]:** See previous comments on this section.

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Jowitt, D. (1991). *Nigerian English Usage: An Introduction*. Zaria: Longman. Print.

Liberman, A. M. & Prince, (1977) A. "On Stress and Linguistic Rhythm." *Linguistic Inquiry* 8, 249-336

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#### General Comments

This is a better attempt. However, there is need to check through some of the contents. There is no Module 2 but there is Module. This needs to be checked and corrected.

The Course Guide has been revised but it needs some more corrections. We tried to put these under where they are noticed.

Section 4.0 is expected to be Conclusion in the NOUN House style. Please, try and spread the SAEs under the sections the questions deal with.

Some TMA sections were also left out. This is not acceptable at all. TMAs are an important part of the continued self-assessment of the student towards the preparation for exams and as a means of attaining mastery.

The reference list should contain those I add and recommended to be added.

I will send any additional comments I may notice with time.

Please, help to do a quick corrections, especially with symbols and any other thing not showing. In addition, you can always make your MS word submission along with the PDF format for the convenience of identifying symbols when editing. Many symbols are not showing in the document, making it difficult to use it in this manner.

Please, help attend to this immediate issues and revert by weekend latest, please. Thank you for your cooperation.