Phonemes and Allophones

I. Phonemes

1. Definition

A phoneme is the smallest unit, by which one can distinguish one word from another, i.e., it is the smallest contrastive unit in the sound system of a language. It is usually represented between slashes /…/.

2. Minimal pair

The phoneme of a language can be found by constructing minimal pairs: for example, *lead* vs *led*, *real* vs. *zeal.* A minimal pair is a pair of words of the same language that have different meanings and which differ in only one sound. Since the difference between the two sounds is meaningful, the words must be stored differently in memory. Since the words differ in only one sound, this difference must be stored in memory. Thus, the difference in sounds is significant, and so the two sounds must both be phonemes.

Here is an example from English:

- /lɪp/ and /**t**ɪp/

These two words are different words of English. But they differ only in their initial sound. Therefore, the [l]/[t] difference is significant for English speakers. Consequently, both [l] and [t] are stored in the memory. Thus, [l] and [t] are part of the English mental alphabet. Another example from English:

- /bæg/ and /b**e**g/

These two words are distinct words of English. Therefore, the speech sounds (in the mouth) [æ], [**e**] are all significant to the mind. So, English includes the phonemes /**e**/ and / **æ** /

- [bi:t] ("beat") /i:/ [bɪt] ("bit") /ɪ/
- [bæt] ("bat") /æ/ [but] ("boot") /u/
- [pʊt] ("put") /ʊ/ [pɔ t] ("pot") /ɑ/

II. **Allophones**

1. Definition

An allophone is a phonetic variant of a phoneme in a particular language. This variant is context-based.

Eg: [**p**^{h} i:k] *peak*

[s**p**i:k] *speak*

[p] [p^{h}] are allophones of the English phoneme /p/ because the 'p' sound in p*eak* is slightly different from the 'p' sound *speak*. You can discover this difference when you repeat the two words loudly several times putting your hand in front of your mouth.

Different languages have different groupings for their phonemes. For instance, [p] and [p^{h}] belong to the same phoneme in English, but to different phonemes in Chinese. In Chinese, switching [p] and [p^{h}] does change the meaning of the word. Thus, switching allophones of the same phoneme won't change the meaning of the word: [sp^{h} It] still means 'spit'. However, switching allophones of different phonemes, however, will change the meaning of the word or result in a nonsense word: [skIt] and [stIt] do not mean 'spit'.

In the light of the above discussion, a ***phoneme*** can be defined as a family of similar sounds which a language treats as being "the same". Members of the family are called its ***allophones***, which are variations from a norm (the phoneme). Frequently, one of all allophones suggests itself as the normal value or phoneme. For example:

[p] and [p^{h}] are allophones of the phoneme /p/

2. The environment

Usually, an allophone is produced when one of the phonemes features changes under the influence of the context in which the phoneme appears. This context is also known as the environment. An environment or a context is all the parts of the utterance that directly surround a given sound. The environment of a sound may be adjacent sounds, or a break in the sound such as at the beginning of a syllable, word or phrase. For example:

A phoneme is made of certain features that are basic to it. If this phoneme occurs in certain phonetic environments, one or more of its features may undergo

changes caused by those environments. Changes can be either random or predictable (by rules). Those changes lead to the production of allophones of this phoneme.

In this lesson, we will discuss two examples of aspects of speech that speakers produce unconsciously. Phonology tries to describe, explain and provide rules for most of those aspects.

1. **Aspiration**

Aspiration is one of the changes that may occur on a phoneme. In other words, it is a feature that characterises one of the allophones of a given phoneme. Put simply, aspiration is the presence of a puff of air at the end of a sound. For example, the voiceless plosive (known also as stop) / p / can be aspirated [p^{h}] (the [^{h}] means aspirated) , i.e., pronounced with a /h/ sound. You can see aspiration by putting your fingers in front of your lips and notice the difference in breathiness as you produce pairs like:

Pin[**p^{h}**I n] and spin [s**p**I n]

Pie [**p^{h}**aɪ] and spy[s**p**aɪ]

In English, word initial voiceless plosives (or stops) / p t k / are aspirated whereas non-word initial voiceless plosives are not aspirated.

Piece [**p^{h}**i:s] and speed [s**p**i:d]

Tea[**t^{h}** i:] and eat [i:**t**]

Cat [**k^{h}**æ t] and fat [f æ**t**]

2. **Velarisation**

It is a secondary articulation of consonants by which the back of the tongue is raised toward the soft palate or velum, from which the name valorization, during the articulation of the consonant. Indeed, the tongue is drawn far up and back in the mouth toward the velum as if to pronounce a back vowel such as */u/.*

In the International Phonetic Alphabet, velarization can be indicated by one of two methods:

1. printing a tide or swung dash through the letter indicates either velarization as in [ɫ] (the velarized equivalent of [l], or **dark *'l')***
2. Printing the symbol [ˠ] after the letter standing for the velarized consonant, as in [lˠ] (the velarized equivalent of [l].

- **The phonological rules**

The English phoneme /l/ has two allophones: the so-called **clear *'l'*** [l], as in *'leave, subtle'* [liv], and **dark *'l'*** or **velarized *'l*** [ɫ], as in *'shield, heal'* [ʃi ɫd, hi ɫ].

- We can say also that 'l' is velarized when word final or before a consonant, as in *'ball, filled'.*
- We can also say that /l/ is not velarized or "light" when it is before a vowel, as in *'lamb, swelling'*

A **clear *l*** /is produced with the front of the tongue high in the mouth and the back of the tongue low. A **dark *l*** /is made with the back of the tongue raised; the center is low; the front may be raised, so that the whole tongue has more or less the shape of a spoon. However, the variation depends mostly on what position /l/ has in a syllable and only partly on what kind of phonemes follow.

Further useful phonological notions

- **Complementary distribution**

In English [p^h] is the aspirated /p/ which appears in specific environments (for example, it occurs in word-initial position) whereas the unaspirated one appears in other contexts (in non word-initial position). For instance, in English, there is no word 'pin' which starts with an unaspirated 'p'. Therefore in English, the allophones aspirated [p^h] and unaspirated [p] of the underlying phoneme /p/ are said to be in complementary distribution. Complementary distribution is the mutually exclusive relationship between two phonetically similar segments (in this case, the segment is the allophone). It exists when one segment occurs in an environment whereas the other segment never occurs.

Allophones occur in complementary distribution because the phonetic environment determines which allophone occurs: if all environments were equal, phonemes would only have one allophone. In addition, the environment affects the allophones most often in a predictable way.

- **Free Variation:** Free variation is the interchangeable relationship between two phones, in which the phones may substitute for one another in the

same environment without causing a change in meaning. phonemic free variation, as in [i] and [ai] of *either*), as well as between the allophones of the same phoneme.

3. *Devoicing*

As we have already seen, some features of sounds may change because of their occurrence in specific environment. For instance, when /l, r, w, j/ (which are voiced) follow the voiceless consonants /p, t, k/ in syllable initial position they are devoiced or produced as voiceless, slightly fricatives. In this case, a small symbol (**˚**) is put at the bottom of each devoiced sound.

4. Vowel shortening

Vowels are shortened by following voiceless consonants, i.e., they are pronounced slightly shorter than usual. When the vowels: **iː, uː, ɜː ɑː ɔː** are shortened by a following voiceless consonant, they transcribed: **i˙ , u˙ , ɜ ˙, ɑ˙ ɔ˙**. Short vowels can similarly be influenced by the following voiceless consonant and are produced even shorter than usual. When the vowels **i, e, ə, ʊ, æ, ʌ** are shortened by the following voiceless consonants, you put a small symbol on each vowel as in **ĕ , ĭ, Ŭ,…**

➢ *Kinds of transcriptions*

It is common to distinguish between two kinds of transcription, based on how many details the transcribers decide to ignore:

a. **The broad transcription** (or phonemic transcription) represents the utterance in terms of phonemes. This is enough information to distinguish a word from other words of the language indicates only the more noticeable phonetic features of an utterance, ignores as many details as possible, capturing only enough aspects of a pronunciation to show how that word differs from other words in the language.
b. **The narrow transcription** (or phonetic transcription) encodes more information about the phonetic variations of the specific allophones in the utterance. It captures as many aspects of a specific pronunciation as possible and ignores as few details as possible. Using the **diacritics** (specific symbols that accompany the sound and that signal the feature of the phoneme that has changed such as «^{h}» for aspirated sounds, «^{ɣ}» for velarized sounds) provided in the IPA. It is possible to make very subtle distinctions between sounds. It

demonstrates how a single phoneme in a particular language can be realized in different ways. The rationale for this kind of transcription relies on the fact that eventhough a language may make distinctions between a small number of phonemes, speakers actually produce more phonetic sounds. In this kind of transcription, the square brackets'[ ]'are usually used.

For example, one particular pronunciation of the English word *little* may be transcribed using the IPA as /lɪtl/ or [lɪt̬]; the broad, phonemic transcription, placed between slashes, indicates merely that the word ends with phoneme /l/, but the narrow, allophonic transcription, placed between square brackets, indicates that this final /l/ ([t̬]) is dark.