

This material aims to consolidate and expand on the basic concepts in phonetics and phonology taught in the introductory course. It is roughly 70% revision. Among other things, it should help students in improving their English pronunciation. The generalisations about English here refer mainly to the so-called *Received Pronunciation* (RP). Information about German and other languages is provided where considered useful.

Note: for homework, please do the exercises in the boxes in this text.

### 1 Phonetics vs. phonology as disciplines

- Branches of **phonetics** (Davis 1998:8f):
  - Articulatory phonetics: speech organs & how they move to produce particular sounds.
  - Acoustic phonetics: what happens in the air between speaker & hearer; measurable using devices such as a sonograph, which analyses frequencies & converts them into a graph.
  - Auditory phonetics: how sounds are perceived by the ear, how the brain interprets the information coming from the ear.
- **Phonology** (occasionally called *phonemics*): the study of sound systems *in particular languages* or of the nature of such systems generally.

Are the following observations in the realm of phonetics or phonology?

1. There are **double articulations** where two potentially independent sounds are pronounced at the same time. Thus the African language Igbo has a sound consisting of a [g] and [b] pronounced simultaneously. However, there is no known language with a sound consisting of the initial consonants in *she* and *see* pronounced simultaneously.
2. **Phonotactic constraints** (constraints on what sounds can be pronounced next to each other): Monolingual English speakers often cannot pronounce [kn] at the beginning of a syllable without inserting a vowel in between the two sounds, unlike German speakers (cf. *Knigge*, *Knecht*). English speakers have no trouble pronouncing *acknowledge*, since [k] and [n] aren't in the same syllable.
3. Another phonotactic problem: I asked native speakers of ten different languages to pronounce the sequence [bdzɡkʃps] without vowels between the consonants. None of them could do this.

- It is often impossible to study phonetics and phonology in complete isolation from each other.

### 2 Miscellaneous preliminaries to the description of sounds

- **Segment**: a sound in the intuitive sense. Distinct from:
  - **Suprasegmentals** like stress, intonation (phenomena based on more than one segment)
  - **Features** (e.g. voicing, tongue height); many phonologists assume that phonological systems deal not with segments but rather the features of which they consist. We study this later.
- Be careful not to overrate the importance of **spelling** (=orthography). It is true that people often try to convert spelling into sounds (cf. acronyms like *AIDS*), but most speech sounds do not realise letters but phonemes. Otherwise people who can't read wouldn't be able to speak.
- English spelling is not a clear reflection of pronunciation, so we need a way of indicating exactly how sounds are pronounced. Phoneticians therefore adopt **transcription** systems. We use the IPA (International Phonetic Alphabet) transcription, as do most phonologists, e.g. *bomb* [bɒm].

### 3 Phonemes, phones and allophones

- Two types of 'p' sound:
  - [p<sup>h</sup>] = *aspirated* 'p': period before the vowel begins where only a puff of air is heard, e.g. *pun*
  - [p] = *unaspirated* (*plain*) 'p': vowel begins immediately after 'p', e.g. *spun*
- In Hindi, aspiration is **distinctive** (**contrastive**): the difference between [p<sup>h</sup>] and [p] yields **minimal pairs**, words which are otherwise pronounced identically:

(1) [p<sup>h</sup>al] 'edge of a knife' vs. [pal] 'take care of' (Spencer 1996:5)

- This isn't true of English. [p<sup>h</sup>] and [p] are in **complementary distribution**, i.e. cannot occur in the same *environment* (position). [p<sup>h</sup>] is only used at the beginning of a syllable and [p] is used elsewhere. (Test this with non-existing words: *pon/spon*; *pab/spab*.) Thus, in English (but not Hindi), [p<sup>h</sup>] and [p] are thus variations of the same sound which appear in different environments.
- To describe these facts clearly, we need terms for different notions of 'sound':
- In any language which has them, [p<sup>h</sup>] and [p] are different **phones** (i.e. different 'sounds' in the narrow sense of the term: they do not have exactly the same pronunciation).
- In English [p<sup>h</sup>] and [p] are instances of the same **phoneme** (i.e. 'sound' in a broad, abstract sense). We say that they **realise** (i.e. pronounce, are variants, representatives of, belong to) the same phoneme. [p<sup>h</sup>] and [p] realise distinct phonemes in Hindi.
- We can say that [p<sup>h</sup>] and [p] are **allophones** of the same phoneme in English. An allophone is a phone which is one of the set of phones which can realise a particular phoneme.
- When transcribing sounds, a **broad** (=phonemic) **transcription** (in slashes, / /, see (2) below) focusses on phonemes rather than phones and a **narrow** (=phonetic) **transcription** (in square brackets, [ ]) if indicating the specific phones involved. The name for a phoneme is unimportant but usually follows conventions established by people working on the language in question. Mostly the IPA symbol for one of the allophones (often the commonest allophone or the one considered most basic) is used.

| (2)            | Broad transcription | Narrow transcription |
|----------------|---------------------|----------------------|
| a. <i>pun</i>  | /pʌn/               | [p <sup>h</sup> ʌn]  |
| b. <i>spun</i> | /spʌn/              | [spʌn]               |

- Understanding spoken language involves working out sequences of *phonemes*, since phonemes are what determines differences in meaning. Native speakers often cannot consciously hear the difference between allophones of the same phoneme, though they can always hear distinctive differences between sounds. Hence English and German speakers find it hard to hear the difference between [p<sup>h</sup>] and [p], while Hindi speakers have no trouble in this.
- Allophones of a phoneme always share some phonetic characteristics with other allophones of the same phoneme. Thus, complementary distribution between two sounds is not enough to prove that they are allophones of the same phoneme. (More on this later.)
- A small percentage of phonemes in the world's languages have allophones which are in **free variation** rather than complementary distribution. Thus, some German speakers may pronounce the word *rot* using different types of /r/ (see below).
- We will see that most phonemes in the world's languages display **allophony** (i.e. have allophones).

## 4 Consonants

### 4.1 The basics

- It is difficult to say what distinguishes consonants from vowels:
  - Older definition: consonants, unlike vowels, cannot be pronounced on their own (hence the old German terms *Selbstlaut*/*Mitlaut*). This is not a useful definition because it is perfectly possible to pronounce e.g. [s] on its own.
  - Phonological definition: Vowels form syllable peaks while (English) consonants are more peripheral in the syllable. Syllables nearly always have vowels, except syllabic consonants, a consonant used as a syllable peak.
  - Phonetic definition: **approximation** (closing together of speech organs) not close enough for there to be *friction* or *stricture* (=closure). Note, however, that semivowels and certain *r* sounds are vowels under this definition.
- Consonants vary according to the following **parameters**:
  - **Place of articulation**: where does the articulatory gesture (movement) occur?
  - **Manner of articulation**: what type of *articulatory gesture*?
  - **Voicing**: do the vocal cords (=vocal folds) vibrate while the sound is produced?

## 4.2 Manners of articulation

- **Plosive:** a complete *stricture* (blockage) at some point in the vocal tract followed by release of the air.
- **Fricative:** the articulators come close enough together for there to be audible friction (turbulence) in the air which sounds like hissing (cf. a window with a 1cm gap during wind).
- **Approximant/frictionless continuant:** a sound where two articulators approach each other, but not close enough for there to be friction. Instead, there is a more resonant sound. These include glides [j,w] (*yet, wet*) and certain types of *r* sounds (see below). Some writers include vowels among the approximants.
- **Affricate:** plosive released as a fricative in the time it takes to pronounce a single consonant:
  - English: [dʒ] in *judge*, [tʃ] in *itch, church*
  - German [pf, ts] in *Pflanze*, [tʃ] in *Tchetschenien*

Affricates take less time a normal sequences of plosive and fricative. Also, there cannot be a pause between the two parts of the affricate. Compare: *the chop* vs. *that shop*.

- **Nasal:** velum (soft palate) is lowered, and air exits via the nose: [n, m], [ŋ] in *sing*
- **Lateral:** air passes along the side of the tongue: These are *l* sounds. More on these later.
- The following refer to natural classes containing more than one of the above articulation types:
  - **Stop:** any sound where there is a complete stricture. This includes all plosives and (English) nasals; the latter involve complete closure at least in the mouth.
  - **Obstruent:** some kind of obstruction (blockage) of airstream (plosives, fricatives, affricates).
  - **Sonorant:** no blockage of flow of air through either mouth or nose, i.e. nasals, laterals, approximants, vowels. In English, sonorants are basically voiced. An acoustic property of sonorants is that they are resonant, i.e. closer to singing than hissing or dull sounds.
  - **Continuant:** a sound which can continue for as long as the speaker has breath, i.e. all sounds but plosives.

## 4.3 Places of articulation

Below are given the places of articulation needed for English and German consonants. Compare these with a diagram of the vocal tract in any introductory text (e.g. Spencer 1996:41).

- **Bilabial:** both lips are active articulators: [p,b,m]
- **Labiodental:** upper lip, lower teeth: [f,v]
- **(Inter)dental:** Dental = tongue touches back of teeth. Interdental: tongue between two rows of teeth. English speakers use one of these two articulations in pronouncing [θ] in *thing, teeth* and [ð] in *the, then, loathe*.
- **Alveolar:** passive articulator is the alveolar ridge (=gum ridge): [t,d,s,z]
- **Postalveolar/alveolo-palatal/ palato-alveolar:** passive articulator is between alveolar ridge & hard palate: [ʃ] in *fish*, [ʒ] in *measure, vision*. Some writers distinguish between these three terms. Thus, Davis (1998:28) says that palato-alveolar is slightly behind postalveolar. You can ignore these distinctions in this course.
- **Palatal:** hard palate is passive articulator: [j] in *yes* and [ç], which is the German *ich*-Laut, and is heard in some dialects when pronouncing e.g. *huge* [çuɔʒ].
- **Velar:** the place of articulation is the velum: the tongue approaches the soft palate at the back of the mouth: [k,g] [ŋ] in *king*
- **Uvular:** thin piece of flesh hanging down from the back of the velum (German *Zäpfchen*). This is irrelevant in English, but is relevant in producing certain German *r* sounds (see below).
- **Glottal:** the glottis is the opening between the vocal cords & the larynx (=voice box)

4. Find as many words as you can which have the sound [ʒ] in them. Try to describe the conditions where [ʒ] is found.

5. The word *Confucian* 'follower of Confucius', pronounced [cɒnfjuʃən], makes it possible to show that /ʒ/ and /ʃ/ are distinct phonemes. Try to work out how this argument would run. Can you find other words on which a similar argument could be based?
6. In English, [h] only occurs at the start of a syllable and [ŋ] is only found at the end of a syllable. They are thus in complementary distribution. Does this mean that we should see them as allophones of the same phoneme?

## 4.4 Difficult consonants

### Rhotics (r sounds)

- There are various different rhotics. Using the wrong one makes one sound foreign, though it doesn't always impede comprehensibility. Here are the most important ones found in English & European languages (sources: Davenport & Hannahs 1998:32, Davis 1998:20, Spencer 1996:19):
  - **Alveolar approximant:** [ɹ]. The commonest type of *r* in English. The tongue is in the position used in pronouncing the vowel in *bird*, i.e. approaches the alveolar ridge.
  - **Retroflex alveolar approximant:** [ɻ]. Like the alveolar approximant, but tongue curled back towards postalveolar area. Used by many Northern US and South West English speakers.
  - **Flap (=tap):** [ɾ]. Tongue tip hits the alveolar ridge, creating a very brief plosive-like effect. Used by many English speakers after dental fricative (*throw, thread*), where the tongue strikes the alveolar ridge on the way from the dental position to the position of the vowel further back. Also used intervocally (*very, marry, lorry*), but mostly confined Scotland. Sometimes sounds a bit pompous if repeated often, e.g. *three very merry married heros*.<sup>1</sup>
  - **Trill (=roll)** really a series of small, fast plosions caused by vibrating tongue against some passive articulator. Two types:
    - [r]: the alveolar ridge is the passive articulator (Scottish, classical singers). The exclamation *brrrr* (used in English by a person who is freezing) uses this *r*.
    - [R]: uvula is passive articulator (e.g. many German, French and some Scottish speakers).
  - **Uvular fricative:** [ʀ]. Used by some German, French speakers.
- Rhotics have no unifying place & manner features. There is perhaps a sense in which they are acoustically similar, e.g. because English speakers who know no German will recognise [ʀ] as a type of *r*. Rhotics are a natural class phonologically because they often alternate with each other over time and between speakers. Thus, German has dialects with approximant *r*'s (like English), and the uvular *r*'s are a modern development (under French influence) which replaced the formerly more common alveolar trill.
- Different rhotics can be distinctive in some languages, e.g. Spanish [r] in *pero* 'but' and [r̄] in *perro* 'dog'.
- Some books use [r] for any rhotic even in narrow transcription when not dealing with differences between rhotics. We will mainly be doing broad transcription, where /r/ can be used to stand for whatever rhotic is being used.
- Some varieties of English don't pronounce /r/ at the end of a syllable: *far* /fa/. Such varieties are called **non-rhotic**.

7. Which sort of rhotics do you use in (a) German, (b) English and (c) other languages? In your native language, does the choice of allophone of /r/ vary according to the phonetic environment (i.e. according to the sounds next to it)? Does it vary according to sociolinguistic factors, e.g. *register* (style level) or in *code switching* between the accent/dialect of the area in which you spent your childhood and the variety you use outside that area? Do any particular allophones of /r/ seem to you to sound like they are characteristic of a particular part of the German-speaking area.

<sup>1</sup> In some American and Australian varieties [r] is also used as a variant for pronouncing /r/ between two vowels (*better, matter*). To speakers who don't do this, [r] sounds like [d] here. See Clark & Yallop (1995:48).

### Laterals (/l sounds)

- **Laterals** (*l*-sounds): Lateral articulation involves a partial closure made with tongue at the alveolar ridge. One or both sides of the tongue are lowered, and air escapes through the resulting passageway. This can be demonstrated as follows (Roach 1991:58f):
  - Pronounce [ldldldld] and feel downward movement of tongue at side.
  - Whisper /l/ loudly and feel air moving along side of tongue. (Whispering makes this easier, since airstream is stronger with unvoiced sounds, as vocal cords don't block airflow.)
- Two allophones:
  - Dark / [ɫ] back of the tongue raised towards the velum (to about the position where the tongue would be in pronouncing the vowel in *look*). This is an instance of *velarisation* or a *velar secondary articulation*. (~ in IPA stands for velarisation.)
  - Clear / [l] back of the tongue in its normal low position.
- [l] appears in syllable onsets (i.e. before vowels) and [ɫ] elsewhere.
- [l] is the only type of /l/ in standard German, French, Spanish and some English dialects, while other other English dialects only have [ɫ].

8. /l/ has more allophones than textbooks commonly tell you. (This applies to all sounds.)  
There is a *dentalised* /l/ in *health*: [heɫθ] and [w] in *help* [hɛpw] in some dialects.  
Speculate on why these allophones might exist.

### Semivowels (Glides)

- [j] (*y*et) is a palatal approximant and [w] (*w*et) a labial velar approximant (i.e. it has velar approximation with a bilabial secondary articulation; this is a case of a **double articulation**<sup>2</sup>). [j] and [w] are called **semivowels** (because they are a mixture between vowels and consonants) or **glides**.
- [j] and [w] are *phonetically* like vowels because they
  - are (normally) voiced
  - lack the phonetic characteristics normally associated with consonants (i.e. friction, closure).
  - [j] and [w] are articulated similarly to [i] and [u] respectively; this becomes clear if one holds the first sounds in *yet*, *wet* for a longer time than usual.
- Semivowels behave *phonologically* like consonants in English because they
  - only occur directly before vowels (unlike other vowels in English)
  - can't be a syllable peak (nucleus) and thus need to appear with another vowel
  - select the *a*-form of the indefinite article
- (3) *a good car; an old car; a yellow car, a white car; \*an yellow car, \*an white car*.
- The /n/ in French *un* 'a(n)' is not pronounced before consonants (*un chat* 'a cat') but it is pronounced before vowels & semivowels (*un oeuf* 'an egg', *un oiseau* [wazo] 'a bird'). (Davis 1998:14)

### The /h/ phoneme

- [h] is phonetically a voiceless glottal fricative, i.e. friction is at vocal folds.
- When pronouncing /h/ the oral articulators move into the position of the following vowel. Thus, [h] is phonetically a voiceless variant of the vowel after it, though phonologically it is a consonant (e.g. it is only found at the start of a syllable). Info from Roach (1991:50f).
- At the start of a syllable, many English speakers pronounce /hj/ as the voiceless palatal fricative [ç] (*huge, hue, Houston*; this is the sound in German *ich*). (Roach 1991:52; Spencer 1996:203f)

### The glottal stop [ʔ]

- Glottal stop [ʔ]: plosive at glottis, i.e. closure of vocal chords, as in coughing. Used in German whenever a syllable does not begin with (another) consonant: *überall* [ʏbɛʔal]. Used in some (e.g.

Cockney) English dialects as allophone for intervocalic /t/: *water* [wɔ:ʔə]. Sometimes used by English speakers striving for special clarity or emphasis: *?I ?am ?against ?all racial ?abuse*. To the English ear, ? sounds like silence rather than a consonant, hence Cockney *water* would be written *wa'er*.

### 4.5 More on voicing

- With voiced sounds, the vocal cords (=vocal folds) are pulled together, so that they vibrate when the air passes them. Some tests for whether a sound is voiced or not (Davis 1998:24):
  - Put hands on larynx (voice box) while saying the sound. If it's voiced, you feel vibrations.
  - 'Sing' a song where the 'text' is a continuous [s]. You can't hear the melody. You can if it is [z].
  - Say [fvfvfv] continuously with ears blocked. [v] echoes inside your head, while [f] doesn't.
- Voicing is phonemic for plosives and fricatives in English. It is not phonemic with nasals, approximants and laterals, although these can be voiced and devoiced to varying degrees.
- Some phonologists deny that voicing is really a parameter for English consonants and replace it with a parameter **fortis** vs. **lenis** (Latin for 'strong/weak', cf. German description of consonants as *hart/weich*). English consonants said to be voiceless are uttered with greater tension of the muscles of the mouth, tongue & throat, and with the air coming more forcefully from the lungs. The fortis/lenis distinction is argued to replace voicing as a parameter because *bet* vs. *bed* and *large* vs. *larch* sound different even in whispering and at the end of an utterance, both contexts where there is little or no voicing. Fortis/Lenis distinguishes *reisen* from *reißen* in whispering; you hear more hissing with the latter. (Davis 1998:25; Roach 1991:32f; Scherer/Wollmann 1986:39). Despite this we will continue to use the notion of voicing here.

### 4.6 More on aspiration

- Recall: [p<sup>h</sup>] (=aspirated /p/) differs from plain /p/ (i.e. [p]) in that a period intervenes between /p/ and the vowel where you can hear nothing but a (voiceless) puff of air. More details:
  - Aspiration is a delaying the **voice onset time** of the vowel (by about a twentieth of a second, Laver 1994:42, 348ff).
  - Aspiration is like pronouncing an /h/ just after the consonant.
- Test for aspiration if you can't actually hear it (like me): hold finger in front of mouth; with aspirated sounds you feel more air hit your finger in production of the sound.
- In English, *voiceless* plosives (/p,t,k/) are aspirated at the *start* of a *stressed* syllable:  
(4) a. scone [skɒn]                      con [k<sup>h</sup>ɒn]                      gone [gɒn]  
b. territory [t<sup>h</sup>erɪtrɪ]                      territorial [t<sup>h</sup>erɪt<sup>h</sup>ɔ:riəl]
- There are phonetic reasons for why aspiration, stress and voicing should be thus associated:
  - Voiced plosives by definition have voicing at their release, so there cannot be a voiceless puff of air at the same time.
  - Voiceless sounds are fortis, and stressed syllables are by their nature more fortis than unstressed ones.

9. With the help of IPA consonant chart (e.g. that given with this handout, or Spencer 1996:40), try to identify all the consonants found in (your variety of) German. Write them out systematically.  
10. If you speak other languages than English and German, try to find sounds that are absent in English and German and identify them on the IPA chart. (We will discuss them in class, so that we are aware of at least some of the many sounds not found in English & German.)

<sup>2</sup> Some books use [v] instead of [w] for the sound in *wet*. Don't imitate this, for [v] can be confused with the vowel [u] in handwriting.

## 5 Vowels

### 5.1 Parameters for describing vowels

Below is a list of all the parameters that could possibly be relevant for English vowels. (We see below that a classification of an English vowel need not mention all of these. Thus, only one of those marked # is necessary.)

- Pure vs. diphthongal: does the quality of the vowel change during its articulation?
- Tongue height: high (=close) vs. high mid vs. low mid vs. low (=open)
- Backness: which part of the tongue is highest (or how far back is the passive articulator)? Possibilities: front vs. central vs. back. Do not confuse *central* (backness) with *mid* (height).
- #Tense vs. lax: Tense vowels are articulated with greater muscular effort & higher air pressure.
- #ATR (advanced tongue root) vs. non-ATR: ATR: the root of the tongue is pushed forward, enlarging the pharynx.
- #Length: short vs. long
- Roundedness: are the lips rounded or spread during the articulation of the vowel?
- (Nasality: in nasal vowels the velum is lowered to let air into the nose.)

### 5.2 The cardinal vowels

- Problem: differences between vowels are gradual rather than absolute.
- Solution: Height and backness are judged with reference to the **cardinal vowels** [i,e,ɛ,a,u,o,ɔ,ɑ]. [i,a,u,ɑ] represent extreme possibilities of articulation: [i] and [u] are the highest possible sounds without friction. [a] and [ɑ] are the lowest possible vowels. [i,a] represent extremes of frontness, [u,ɑ] extremes of backness. The heights high/high mid/low mid/low are equidistant from each other.
- The cardinal vowels aren't necessarily present in a language, rather they are landmarks with reference to which the vowels in a particular language are located.
- IPA symbols use the names of the cardinal vowels, but they extend beyond the cardinal interpretations. Thus, [i] is used for German *sie* and English *see* although cardinal [i] is a bit higher & further forward than German [i], which is a bit higher & further forward than English [i].

### 5.3 Pure vowels

Check the IPA vowel chart (e.g. Spencer 1996:40) for more details on the vowels.

#### 5.3.1 High vowels

- (5) [i:] (*tree, me*)
- (6) [ɪ] (*it*)
- (7) [u:] (*root, lute, use*)
- (8) [ʊ] (*look, put*)

The high tense vowels [i, u] are realised as diphthongs (e.g. [iɪ, uʊ]) in many varieties.

#### 5.3.2 Mid vowels

- (9) [ɛ] or [e] (*get, bread*)

This vowel is between [ɛ] and [e], but closer to [ɛ], but it is often transcribed as [e] for convenience. (Davis 1998:39f; D&H 1998:45) This is the vowel in German *Bett*.

- (10) [ɔ:] (*taught, thought, sort, thaw*)

This vowel is midway between cardinal [ɔ] and [o] (Davis 1998:40).

This vowel is replaced by low back vowels like [ɒ] or [ɑ] in some US varieties.

- (11) [ə:] or [ɜ:] (*first, nerd, blur, word, nurse, fir, worse, her*)

This vowel is always followed by <r> in spelling. It arose historically from the influence of /r/ on the original vowel. It was an **r-coloured (rhotacised)** vowel. Other

examples of r-coloured vowels are in some US varieties, where back & central vowels followed by /r/ have a retroflex articulation during whole articulation of vowel. This is transcribed by adding the diacritic ̄ (e.g. *first* [fɜ̄st]).

- (12) [ə] (*butter, away*)

[ə] is called **schwa**. Most English unstressed syllables have [ə] (though many words have weak syllables which are pronounced [ɪ] by some speakers: *women, hatless, behave, buses, illegal).*

11. The verb prefix *re-* can be pronounced either [rə/ri] or [ri:]. Work out (perhaps consulting a native speaker or dictionary) which of the pronunciations is appropriate in the following words. What determines which pronunciation is used?  
*reappear, reattach, record, redirect, reform, rehearse, remove, repeat, reprint, reseal,*

#### 5.3.3 Low vowels

- (13) [ɑ:] or [a:] (*far*)

[ɑ] is low back unrounded and [a] is low front unrounded.

- (14) [ɒ] (*dog*)

Some speakers use a the short low mid vowel [ɔ] (=Ger. *Gott*) instead. [ɒ] is unrounded to [ɑ] in most US varieties, so it sounds like the vowel in *far*.

- (15) [æ] (*axe*)

This vowel is nasal in some US varieties: *pat* [pæ̃t] (otherwise nasal vowels are found in English only by assimilation to a following nasal consonant: *pin, pan, bomb*).

- (16) [ʌ] (*cup, love, country, blood, does*)

[ʌ] derived historically from [ʊ], but the sound change didn't affect all instances of [ʊ] (*butcher, put*). Some Northern English dialects didn't undergo this sound change. When trying to speak RP, these speakers may overcorrect, pronouncing words spelled <u> with [ʌ] even though they are [ʊ] in RP.

## 5.4 ATR vs. length vs. tenseness and the problem of redundancy

What is the difference between [u] and [ʊ] and between [i] and [ɪ]? Four possible answers:

- Quality: [u,i] are by definition further away from centre of mouth than [ʊ, ɪ].
- Length: [u,i] are always long and [ʊ,ɪ] are always short *in English*.
- ATR: [u,i] are ATR, while [ʊ,ɪ] are non-ATR.
- Tenseness: [u, i] are tense, while [ʊ, ɪ] are lax.

An exact *phonetic* analysis would have to specify all these things. However, an analysis of *English phonology* which specifies all these parameters has a lot of *redundancy* in it (is *uneconomical*), since if we know one of the above properties of [u, ʊ, i, ɪ], we know all the others. As a general scientific principle, it is better to choose the most economical analysis which covers the facts. Therefore:

- Many phonologists omit the length sign in [i], [u], since English lacks short [ɪ,u].
- Any one of the following types of phonological *classifications* is acceptable. (All are acceptable since phonologists disagree on which is the best approach, cf. Spencer (1996:29,32-34).)
  - (a) English [i] is a high front tense unrounded vowel
  - (b) English [i] is a high front ATR unrounded vowel
  - (c) English [i] is a high front long unrounded vowel

## 5.5 Diphthongs

**Diphthong:** a segment consisting of two vowels pronounced in the time taken to pronounce a single (long) vowel. We discuss diphthongs in terms of two different parameters: (a) direction in which tongue moves (closing vs. centring diphthongs) or (b) prominence of first or second vowel (rising vs. falling diphthongs).

### 5.5.1 Closing vs. centring diphthongs

**Closing diphthongs:** the final vowel is higher than the first one:

- (17) [ai] (*try, die*)
- (18) [au] (*thou, now*)
- (19) [ei] (*tray, bait, late*)
- (20) [ɔɪ] (*boy*)
- (21) [əʊ]/[oʊ] (*boat*) ([oʊ] is used in General American)

**Centring diphthongs:** movement towards a central vowel (schwa):

- (22) [ɪə] (*ear, pier*)
- (23) [eə]/[ɛə] (*pear, bare, there, air*)

- English centring diphthongs derive historically from weakening of /r/ to schwa. Rhotic dialects obviously lack these diphthongs.
- Older RP speakers have more centring diphthongs: *pour* [pɔə], *poor* [puə]. Young RP and many other speakers realise these as [ɔ:], so that *paw, pour, poor* are all [pɔ:]. (Davis 1998:45)

### 5.5.2 Rising vs. falling diphthongs

- **Rising (crescendo) diphthongs** vs. **falling (diminuendo) diphthongs:** English is often said to have only falling diphthongs: i.e. first vowel is more *prominent* (more forceful, slightly longer).
- (Extra info:) The closest thing to rising diphthongs in English are in words like *gradual, usual, idiom, period, serious, easier, hideous*. Three possible pronunciations (Davis 1998:126):
  - [ɪ ə, u ə]: two syllables
  - [ɪə, ũə]: rising diphthong: ˜ is the sign for decreased prominence.
  - [jə, wə]: first vowel reduced to a glide

## 5.6 Triphthongs and r-coloured vowels

**Triphthongs:** glide from one vowel to another, then change direction (Davis 1998:46):

- (24) [aɪə] (*fire, iron*)
- (25) [eɪə] (*layer, iron*)
- (26) [ɔɪə] (*boyant*)
- (27) [aʊə] (*hour, power*)
- (28) [əʊə]/[oʊə] (*lower, Noah*)

- Like centring diphthongs, these are the non-rhotic equivalents of vowel+/r/ in rhotic dialects, except that this time the vowel is a diphthong rather than a pure vowel.
- Triphthongs can usually be replaced by bisyllabic pronunciation diphthong+[ə], but there are speakers who differentiate *flower* (2 syllables) vs. *flour* (triphthong).

12. Linguists who believe that the vowel in *first, nerd* has the quality [ə] rather than [ɜ] never omit the length symbol 'ː' in [ɜː]. Why?
  13. Transcribe *Why choose white shoes?* What is the difference between the pronunciation of the first two and the second two words?
  14. Transcribe the words in (a), (b) and (c) below. What phenomenon is present in all words in (a) but absent in (b), and is distinctive in the minimal pairs in (c)? (This phenomenon can also be heard when non-German-speakers try to pronounce German *Duden, Dürer, Universität*.) Describe the phenomenon in question as precisely as possible. (A clue: Does the second word in *a use for it* begin with a semivowel, vowel or diphthong?)
    - a. *unite, utility, U.C.L.A., abuse, few, spew*
    - b. *ooh!, zoom, sluice, clue, boo, doom, dude*
    - c. *to use vs. to ooze; do vs. due/dew; coo vs. cue*
  15. Write down the classifications for all the vowels in (5)-(28) above. (E.g. [Y] is a high front lax rounded vowel.)
  16. Prove that the following pairs of sounds are or are not allophones of the same phoneme: English [i, ɪ], English [eɪ, æ], German [z] and [s].
  17. The vowel symbols below contain the vowels of standard German. With the help of the IPA chart and your intuitions about German pronunciation, try to match the vowels underlined in the following words to the IPA symbols: *Fr̄st, Tr̄st, sp̄cken, sp̄ken, b̄igen, b̄iten, Bahn, Bann, Beet, Bett, H̄lle, H̄hle, f̄llen, f̄hlen, steigen, steigern* (when <er> is pronounced as a vowel, not schwa+/r/). The vowels are organised systematically in columns. What do the members in the respective columns have in common?
- |      |     |     |     |
|------|-----|-----|-----|
| [i:] | [y] |     | [u] |
| [ɪ]  | [Y] |     | [ʊ] |
| [e]  | [ø] | [ə] | [o] |
| [ɛ]  | [œ] |     | [ɔ] |
|      |     | [ɐ] |     |
| [a]  |     |     | [ɑ] |
18. German has (at least) three diphthongs. Find words containing them and try to transcribe them. (Looking at a German text should help you to find examples if you can't think of them spontaneously.)
  19. Is vowel roundedness distinctive in English? In German?
  20. Vowels are more likely to vary between dialects and over time than are consonants. Why?
  21. Transcribe the first paragraph of p. 1 on this handout (i.e. that beginning *This material...*)

## 6 Literature

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