

English Vowels, p. 1

High front

<i>heat, seed, key:</i>	long and tense [i:], often diphthongized [iy]
<i>hit:</i>	lax [ɪ]
<i>happy:</i>	varies between [ɪ], [i:/iy], and short tense [i]
<i>r-less pier:</i>	lax centering diphthong [iə]; tense [iə] in some dialects

High back

<i>hoot, mood:</i>	long and tense [u:], often diphthongized [uw]
<i>hood, put</i>	very lax [ʊ]
<i>r-less poor:</i>	lax centering diphthong [ʊə]; tense [uə] in some dialects

<i>cute:</i>	long and tense [yu:], often triphthong [yuw]
<i>volume:</i>	short and lax [yʊ]
<i>menu:</i>	varies between [yʊ], [yu:/yuw], and short tense [yu]
<i>r-less pure:</i>	lax centering triphthong [yuə]; tense [yuə] in some dialects

Mid front

<i>late, dare:</i>	long, tense and diphthongized [ey]. Not diphthongized before [r].
<i>let:</i>	lax [ɛ]
<i>r-less dare:</i>	lax centering diphthong [ɛə]; tense [eə] in some dialects

Mid central/back

<i>coat:</i>	long, tense and diphthongized GA [ow] RP [əw]
<i>hut:</i>	lax [ʌ]. Centralized and lowered in present-day RP

unstressed:	almost exactly mid central [ə]
<i>r-less bird:</i>	lengthened and tenser [ə:]*

Syllabic [ɹ] is sometimes considered to be an “r-colored” mid central vowel. As an alternative to the symbol [ɹ], it can be transcribed as [ɻ] when short, lax, and unstressed, and as [ɻ:] when longer, tenser, and stressed.

Low

<i>hat:</i>	front lax [æ]
<i>buy, bite</i>	diphthong with varying backness for starting position [ay]
<i>cot, rock:</i>	back lax. rounded in RP [ɔ]**; unrounded in GA [a]
<i>father; r-less star:</i>	central to back and long [a:]. Centering diphthong [aə] in some dialects.
<i>how, gout</i>	diphthong with varying backness for starting position [aw]
<i>caught; r-less door:</i>	back, tense and usually long [ɔ:]. Very tense in RP (higher and more rounded). Centering diphthong [əɔ] in some dialects
<i>voice:</i>	diphthong [ɔy]

* The symbol [ɜ] is sometimes used instead.

** The symbol [ɒ] is sometimes used instead.

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Vowel Length

Our feature system does not distinguish between long vowels and short vowels. This is because length isn't about how a vowel is articulated, but rather for how long it is articulated. For this reason, the usual analysis of long vowels is that they are doubled vowels. This means that a more accurate representation of, for example, [i:] would be [ii]. We will continue to use the more conventional representation, but with the understanding that what ":" really represents is the doubling of the vowel.

Syllables and Stress

Words are organized phonologically into syllables. We will not be discussing syllable structure, but it is important to note that every syllable has a "head", which is usually a vowel. For example:

[fə.na.lə.ji]
[sɪn.tæks]
[sə.mæn.tɪks]
[mɔr.fə.la.jɪ.kl]
[sɪ.lə.bl]

The head (more commonly called the "peak" or "nucleus") of a syllable is said to be "syllabic".

Syllables (or their peaks) differ from each other in degree of strength, technically known as "stress". The strongest syllable in a word is said to carry primary (or main) stress, indicated by putting an acute accent (´) over its peak; the weakest syllables are said to be unstressed and are not specially marked; and syllables intermediate in stress are said to carry secondary stress, indicated with a grave accent (`). These stresses can be marked either on the spelling or on the phonetic representation:

[fənáləji]	phonology
[sɪntæks]	syntax
[səməntɪks]	semantics
[mɔrfələjɪkl]	morphological
[sɪləbl]	syllable

Beginnings of an analysis

First of all, the vowel [ə] is the vowel in unstressed syllables. It is not a phoneme of English; it is an allophone of all the vowel phonemes of English. There is a rule of Vowel Reduction which changes unstressed vowels into schwa. In addition, in [ə] followed by a sonorant consonant the [ə] deletes and the sonorant becomes syllabic.

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equator	[əkwéytr̩]	/ɛkweytɔːr/
equatorial	[ɛkwətóːriəl]	/ɛkweytɔːr+iæl/
grammar	[græmr̩]	/græmər/
grammatical	[grəmæDɪk]	/græmæt+ik+æɪl/
grammaticality	[grəmæDɪk ^h éɪlɪti]	/græmæt+ik+æɪl+iti/
agile	[æjɪl]	/æjɪl/
agility	[æjɪlɪDi]	/æjɪl+iti/
drama	[drá:mə]	/dra:mæ/
dramatic	[drəmæDɪk]	/dra:mæt+ik/
cylinder	[sɪlɪndr̩]	/sɪlɪndr/
cylindrical	[səlɪndrɪk]	/sɪlɪndr+ɪk+æɪl/

Note: Sometimes it is impossible to tell what the underlying form of a [ə] is. For example, in the word *thousand* [θawzənd] there is no way to get stress onto the syllable with the [ə]. So we know that there is some vowel in that syllable, but we can't tell what it is. The underlying representation is /θawzVnd/, where /V/ means "some vowel".

Second, note the remaining vowels:

Diphthongs			Short vowels			"r-less"	
[iy]	[yuw]	[uw]	[ɪ]	[yʊ]	[ʊ]	dialect-specific vowels	
[ey]	[əw] (RP)	[ow] (GA)	[ɛ]	[ʌ]			
	[aw] [ay]	[ɔy]	[æ]	[a] (GA)	[ɔ] (RP)	[aː]	[ɔː]

In particular, note the diphthongs. In the high and mid vowels, the backness of the glide is the same as the backness of the vowel. Since the glide of the diphthong is predictable, it is not underlying. Instead, the diphthongs are underlying long vowels. For example, [ey] is underlying /eː/. A rule of diphthongization changes long vowels into vowel+glide (or rather, changes the second component of the long vowel into a glide).

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All long vowels/diphthongs are tense. Since tenseness/laxness is predictable, it is not part of the underlying feature structure of English vowels. For example, [ɛ] is underlying /e/, or, in features:

phonetic:

[- hi
- lo
- rd
- bk
- tns]

underlying:

[- hi
- lo
- rd
- bk]

Next, note the following:

	long		short	
A	[ey] (or /e:/)	insane vain profane volcano grateful gymnasium Iranian	[æ]	insanity vanity profanity volcanic gratitude gymnastics Iran
E	[iy] (or /i:/)	serene severe impede brief meter creep	[ɛ] (or /e/)	serenity severity impediment brevity metric crept
I	[ay]	divine invite incline recite satire	[ɪ] (or /i/)	divinity invitation inclination recitation satiric
O	[ow] (or /o:/)	verbose cone harmonious Babylonia	GA [a] RP [ɔ]	verbosity conic harmonic Babylon
U	[(y)uw]	assume reduce Lilliputian	[ʌ]	assumption reduction Lilliput

([ʌ] also pairs up with [aw] (*pronounce-pronunciation*) and [ɔy] (*destroy-destruction*))

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The phonology of English vowels has to reflect these long-short pairings of vowels, but doing this is beyond what we will be doing in this course. We can informally use the orthographic letters (as in the first column) as a representation of the vowels. So we will represent the vowel underlying [iy] as /E:/, and the vowel underlying [ε] as /E/. We will not formulate the lengthening and shortening rules.

The [y] of /yuw/: American vs. British English

Consider the following words:

		<u>British (RP)</u>	<u>American (GA)</u>
1.	pure	[pyʊə]	[pyur]
2.	cute	[kyuwt]	[kyuwt]
3.	tune	[tyuwn]	[tuwn]
4.	abuse	[əbyuwz]	[əbyuwz]
5.	dues	[dyuwz]	[duwz]
6.	argue	[a:gyu]	[argyu]
7.	muse	[myuwz]	[myuwz]
8.	new	[nyuw]	[nuw]
9.	lewd	[lyuwd]	[luwd]
10.	few	[fyuw]	[fyuw]
11.	view	[vyuw]	[vyuw]
12.	enthuse	[ɛnθyuwz]	[ɛnθuwz]
13.	suit	[syuwt]	[suwt]
14.	hue	[hyuw]	[hyuw]
15.	refute	[rəfyuwt]	[rəfyuwt]
16.	reduce	[rədyuws]	[rəduws]

As we can see, there are some words which are pronounced with [yu] in both British English and American English, and other words that have [yu] in British and [u] in American. It is predictable when the [y] will drop in American English (what is the environment?), suggesting that there is a rule of “American y Deletion” that derives the American pronunciation from something like the British pronunciation. So, for example, *reduce*, [rəduws] in American English, derives from /rədyuws/ (or rather /rədU:s/).

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So ...

<i>heat, seed, key:</i>	[i:]/[iy]	/E:/	
<i>hit:</i>	[ɪ]	/I/	
<i>happy:</i>	[ɪ]/[i:/iy]/[i]	/I/	
<i>hoot, mood:</i>	[u:]/[uw]	/u:/	
<i>hood, put</i>	[ʊ]	/u/	
<i>cute:</i>	[yu:]/[yuw]	/U:/	In American English, sometimes [uw]
<i>volume:</i>	[yʊ]	/yu/	A single phoneme, so there is obviously more to say
<i>menu:</i>	[yʊ]/[yu:/yuw]/[yu]	/yu/	
<i>late:</i>	[ey]	/A:/	
<i>let:</i>	[ɛ]	/E/	
<i>coat:</i>	GA [ow] RP [əw]	/O:/	
<i>hut:</i>	[ʌ]	/U/	
<i>hat:</i>	[æ]	/A/	
<i>buy, bite</i>	[ay]	/I:/	
<i>cot, rock:</i>	GA [a] RP [ɔ]	/O/	
<i>father; r-less star:</i>	[a:]	/a:/	
<i>how, gout</i>	[aw]	/aw/	Since this shortens to [ʌ], there is more to say
<i>caught; r-less door:</i>	[ɔ:]	/ɔ:/	
<i>voice:</i>	[ɔy]	/ɔy/	Since this shortens to [ʌ], there is more to say

Sample underlying representations

grammar	[græmr̩]	/grAmAr/
insane	[ɪnséyn]	/ɪn+sA:n/
insanity	[ɪnsæniDi]	/ɪn+sA:n+ItI/
drama	[drá:mə]	/dra:mA/
syntax	[sɪntæks]	/sɪntAks/
Shakespeare	[ʃeykspiyr]	/ʃA:kspE:r/
Dickens	[dɪkənz]	/dɪkEnz/

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Phonological rules

Lengthening and Shortening rules

We will not be stating these in this course

Vowel Spell-Out

A: → e:	ʌ → æ	E: → i:	E → e
I: → ay	I → i	U: → yu:	U → ʌ
O: → o:	O → a (GA) ; O → ɔ (RP)		

Laxing

$[-\text{cons}] \rightarrow [-\text{tense}] / \text{ ______ } [+ \text{cons}]$

Diphthongization

$[-\text{cons}]_2 \rightarrow \left[\begin{smallmatrix} + \text{hi} \\ - \text{syll} \end{smallmatrix} \right] / [-\text{cons}]_1 \text{ ______ }$

Condition : $[-\text{cons}]_1 = [-\text{cons}]_2$

American y Deletion

$\left[\begin{smallmatrix} - \text{cons} \\ + \text{hi} \\ - \text{bk} \\ - \text{syll} \end{smallmatrix} \right] \rightarrow \emptyset / \left[\begin{smallmatrix} + \text{cons} \\ \text{coronal} \end{smallmatrix} \right] \text{ ______ } \left[\begin{smallmatrix} + \text{hi} \\ + \text{bk} \end{smallmatrix} \right]$

Vowel Reduction

$\left[\begin{smallmatrix} + \text{syll} \\ - \text{cons} \\ - \text{stress} \end{smallmatrix} \right] \rightarrow \text{ə}$

Phonological derivations

	<i>seed</i>	<i>crept</i>	<i>assume</i>	<i>phonological</i>
	/sE:d/	/krE:p-t/	/VsU:m/	/fO:n+OlOj+IkAl/
Length/Short		krEpt		fOnOlOjIkAl
VS	si:d	krept	Vsyu:m	fanaɫajɪkəl
Laxing		krɛpt		fanaɫajɪkəl
Diphthong	siyd		Vsyuwm	
Am y Del			Vsuwm	
V Reduction			əsuwɪm	fənəɫajɪkəl
other rules				fənəɫajɪkəl
	[siyd]	[krɛpt]	[əsuwɪm]	[fənəɫajɪkəl]