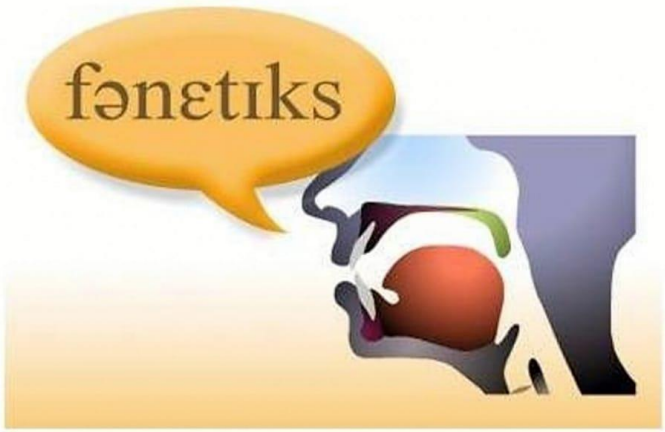

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PHONETICS

THIRD YEAR

ENGLISH DEPARTMENT

GENERAL EDUCATION

DR. REWAA AHMED ANWER

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The 44 Sounds (Phonemes) of English

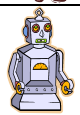
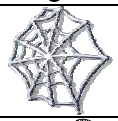
A **phoneme** is a speech sound. It's the smallest unit of sound that distinguishes one word from another. Since sounds cannot be written, we use letters to represent or stand for the sounds. A **grapheme** is the written representation (a letter or cluster of letters) of one sound. It is generally agreed that there are approximately 44 sounds in English, with some variation dependent on accent and articulation. The 44 English phonemes are represented by the 26 letters of the alphabet individually and in combination.

Phonics instruction involves teaching the relationship between sounds and the letters used to represent them. There are hundreds of spelling alternatives that can be used to represent the 44 English phonemes. Only the most common sound / letter relationships need to be taught explicitly.

The 44 English sounds can be divided into two major categories – consonants and vowels. A **consonant** sound is one in which the air flow is cut off, either partially or completely, when the sound is produced. In contrast, a **vowel** sound is one in which the air flow is unobstructed when the sound is made. The vowel sounds are the music, or movement, of our language. The 44 phonemes represented below are in line with the International Phonetic Alphabet.

Consonants

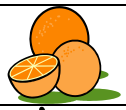
Sound	Common spelling	Spelling alternatives					
/b/	b ball		bb ribbon				
/d/	d dog		dd add	ed filled			
/f/	f fan		ff cliff	ph phone	gh laugh	lf calf	ft often
/g/	g grapes		gg egg	gh ghost	gu guest	gue catalogue	
/h/	h hat		wh who				
/j/	j jellyfish		ge cage	g giraffe	dge edge	di soldier	gg exaggerate
/k/	k kite		c cat	ch christmas	cc acclaim	lk folk	qu bouquet
			q(u) queen	ck back	X box		
/l/	l leaf		ll spell				
/m/	m monkey		mm summer	mb climb	mn autumn	lm palm	
/n/	n nest		nn funny	kn knight	gn gnat	pn pneumonia	
/ng/	ng ring		n sink	ngue tongue			

/p/	p pig		pp happy				
/r/	r robot		rr carrot	wr wrong	rh rhyme		
/s/	s sun		ss mess ce rice	c circus se horse	sc science	ps psychology	st listen
/t/	t tap		tt batter	th thomas	ed tapped		
/v/	v van		f of	ph stephen	ve five		
/w/	w web		wh why	u quick	o choir		
/y/	y yo-yo		i opinion	j hallelujah			
/z/	z zebra		zz buzz se cheese	s has	ss scissors	x xylophone	ze maze

Digraphs

Sound	Common spelling	Spelling alternatives					
/zh/	s treasure		si division	z azure			
/ch/	ch cheese		tch watch	tu future	ti question	te righteous	
/sh/	sh shark		ce ocean sci conscience	s sure ti station	ci special	si tension	ch machine
/th/ (unvoiced)	th thongs						
/th/ (voiced)	th feather						

Short vowels

Sound	Common spelling	Spelling alternatives					
/a/	a cat		ai plaid				
/e/	e egg		ea bread	u bury	ie friend	ai said	a many
			eo leopard	ei heifer	ae aesthetic	ay say	
/i/	i igloo		e england	o women	u busy	ui build	y hymn
			ie sieve				
/o/	o orange		a swan	ho honest			
/u/	u mug		o monkey	oo flood	ou trouble		
/oo/	oo book		u bush	ou could	o wolf		

Long vowels

/ā/	ai snail		a baby	eigh weigh	aigh straight	ay hay	et croquet
			ei vein	au gauge	a-e cake	ea break	ey they
/ē/	ee bee		e me	ea seat	y lady	ey key	oe phoenix
			ie brief	i ski	ei receive	eo people	ay quay
/ī/	i spider		y fly	igh night	ie pie	uy buy	ye rye
			ai aisle	is island	eigh height	i-e kite	
/ō/	oa boat		o-e bone	o open	oe toe	ow low	ough though
			eau beau	oo brooch	ew sew		
/ü/	oo moon		ew screw	ue blue	u-e flute	oe shoe	ough through
			ui fruit	o who	oeu manoeuvre	ou croup	
/y//ü/ (2 sounds)	u uniform		you you	ew few	iew view	yu yule	eue queue
			eau beauty	ieu adieu	eu feud		

/oi/	oi coin		oy boy	uoy buoy			
/ow/	ow cow		ou shout	ough bough			
/ə/ *(Schwa sound)*	er ladder		ar dollar	our honour	or doctor	i dolphin	e ticket
			u cactus	ur augur	re centre	eur chauffeur	

'R' controlled vowels

/ã/	air chair		are square	ear pear	ere where	eir their	ayer prayer
/ä/	ar car		a bath	au laugh	er sergeant	ear heart	
/û/	ir bird		er term	ur burn	ear pearl	or word	our journey
			yr myrtle				
/ô/	aw paw		a ball	or fork	oor door	ore more	oar board
			our four	augh taught	ar war	ough bought	au sauce
/ēə/	ear ear		eer steer	ere here	ier pier		
/üə/	ure cure		our tourist				

Tricky Graphemes

There are some letters that are used to write down sounds already represented by other graphemes. For example we use the letter c to represent the /k/ sound (already represented by the grapheme 'k') and the /s/ sound (already represented by the grapheme 's').

Letter			
c	/k/ as in cat, cot, cup	/s/ as in city, cycle, cents	
x	/k//s/ as in box, fox, fix	/g//z/ as in example, exam	/z/ as in xylophone
q(u)*	/k//w/ as in queen	/k/ as in bouquet, marquis, cheque	

* the q is always paired with the letter u.

The Consonants of American English

Marla Yoshida

How do we describe consonants?

Consonants are sounds in which the air stream meets some obstacles in the mouth on its way up from the lungs, as we learned earlier. Most consonants are not as smooth-sounding as vowels; they pop, hiss, snap, or hum. The table below shows the phonemic symbols for American English consonants. There are alternate symbols for a few of these sounds, but overall, the consonant symbols are very consistent across different versions of the phonemic alphabet, and they are basically the same for American English and British English.

Consonants of American English

Example	Symbol	Example	Symbol
*p*ot	/p/	*sh*op	/ʃ/ or /š/
*b*ook	/b/	bei*g*e	/ʒ/ or /ž/
*t*ake	/t/	*h*ouse	/h/
*d*og	/d/	*ch*ip	/ʧ/ or /č/
*c*at	/k/	*j*ump	/ʤ/ or /ǰ/
*g*ood	/g/	*m*an	/m/
*f*un	/f/	*n*ow	/n/
*v*ery	/v/	si*ng*	/ŋ/
*th*ick	/θ/	*l*amp	/l/
*th*en	/ð/	*r*oad	/r/
*s*un	/s/	*w*in	/w/
*z*oo	/z/	*y*ou	/y/ or /j/
(*wh*y)	(/hw/)	Most speakers of English don't use /hw/ as a separate phoneme. They use /w/ instead.	

Most words in English contain at least one consonant, and some contain many more. For example, *at* and *she* each contain one consonant sound, *play* contains two, and *spring* contains four. (Remember that we're counting the consonant *sounds,* not the consonant *letters.*) But words don't have to have any consonants at all. For example, the words *I, a,* and *oh* have no consonant sounds—only vowels.

Phonologists classify consonants by describing these three sets of categories:

- **Voicing**
- **Place of articulation**
- **Manner of articulation**

Voicing

When the vocal cords are stretched tight so that they vibrate during the pronunciation of a sound, we say that the sound is **voiced**. Sounds that are produced without vibration of the vocal cords are called **voiceless**. To tell if a sound is voiced or voiceless, touch your throat gently as you say it. When you say a voiced sound, you can feel a vibration or buzzing in your throat. For a voiceless sound, you can't. You can also feel the voicing of sounds by putting your fingers in your ears. When you say a voiced sound, it will seem louder. When you say a voiceless sound, it won't.

When you do this with students, try to say only the sound you're listening to, without a vowel after it. For example, to practice /t/, say only /t/, not /tə/ or /tiy/. If you pronounce a vowel after /t/, the voiced vowel will cause vibration and students will be confused and might mistakenly think that /t/ is voiced.

Many of the consonants of English form pairs—a voiced and a voiceless sound that are the same except for voicing. For example, /b/ and /p/ are identical except that /b/ is voiced and /p/ is voiceless. (Notice that one of these pairs—the voiceless sound /θ/and the voiced sound /ð/—are both spelled with the same two letters: *th*.) However, the voiced sounds /m/, /n/, /ŋ/, /l/, /r/, /w/, and /y/ have no voiceless counterparts, and the voiceless sound /h/ has no voiced counterpart.

The box on the next page shows the voiced and voiceless consonant sounds of English. Paired sounds in boxes next to each other. If a sound has a gray box next to it, it has no paired sound.

Voicing of English Consonants			
Voiced Consonants		Voiceless Consonants	
/b/	*b*ig	/p/	*p*en
/d/	*d*og	/t/	*t*op
/g/	*g*ive	/k/	*c*at
/v/	*v*ote	/f/	*f*ood
/ð/	*th*is	/θ/	*th*ick
/z/	*z*oo	/s/	*s*un
/ʒ/	bei*g*e	/ʃ/	*sh*ip
		/h/	*h*ouse
/dʒ/	*j*uice	/tʃ/	*ch*ip
/m/	*m*an		
/n/	*n*ow		
/ŋ/	si*ng*		
/l/	*l*ove		
/r/	*r*un		
/w/	*w*et		
/y/	*y*es		

Place of articulation (Where?)

We can also classify consonants by referring to the parts of the articulatory system that are active when we produce each sound. This is called the **place of articulation**. As you can see in the list below, some of these terms are similar to the names of the parts of the articulatory system that are used in making them.

- **Bilabial:** Both lips touch or almost touch. The sounds in this group are /p/, /b/, /m/, and /w/.
- **Labiodental:** The upper teeth softly touch the lower lip. The sounds in this group are /f/ and /v/.
- **Dental (also called interdental):** The tip of the tongue touches the bottom edge of the top teeth or between the teeth. The sounds in this group are /θ/ and /ð/.
- **Alveolar:** The tip of the tongue touches or almost touches the alveolar ridge (the tooth ridge). The sounds in this group are /t/, /d/, /s/, /z/, /n/, and /l/.
- **Palatal (also called alveopalatal):** The blade of the tongue touches or almost touches the hard palate. The sounds in this group are /ʃ/, /ʒ/, /ʧ/, /ʤ/, /r/, and /y/.

- **Velar:** The back of the tongue touches the soft palate. The sounds in this group are /k/, /g/, and /ŋ/.
- **Glottal:** There is friction in the glottis (the space between the vocal cords). The only phoneme in this group is /h/.

Manner of articulation (How?)

There is often more than one sound that is pronounced in the same part of the mouth, that is, with the same place of articulation. To distinguish between these similar sounds, we can describe their **manner of articulation.** This tells how we produce a particular consonant sound—whether it comes out smoothly or roughly, whether it's like a pop or a hiss or a hum. The manners of articulation for English consonants are listed below.

- **Stops (also called plosives):** The air stream is blocked completely somewhere in the mouth, air pressure builds up, and then it's released, like a tiny explosion. The stops in English are /p/, /b/, /t/, /d/, /k/, and /g/.
- **Fricatives:** The air stream is compressed and passes through a small opening in the mouth, creating friction—a hissing sound. The air stream is never completely blocked, so the sound can continue. The fricatives are /f/, /v/, /θ/, /ð/, /s/, /z/, /ʃ/, /ʒ/, and /h/.
- **Affricates:** A combination of a stop followed by a fricative—an explosion with a slow release. The affricates are /ʧ/ and /ʤ/. Each of these symbols is made up of two parts—a stop symbol and a fricative symbol. This reminds us that the sounds also have two parts.
- **Nasals:** In these sounds, the tongue or lips block off the vocal tract so air can't go out through the mouth. Instead, the passage leading up into the nose opens so that the air stream can go out through the nose. The sounds in the nasal group are /m/, /n/, and /ŋ/.
- **Liquids:** These are sounds that are pronounced very smoothly, like water flowing in a river. The air stream moves around the tongue in a relatively unobstructed manner. The liquid sounds in English are /l/ and /r/.
- **Glides (also called semivowels):** A glide is like a very quick vowel. For this reason, they're sometimes called semivowels, which means "half-vowels." They sound like vowels, but they can function as consonants. The glides in English are /w/ (which sounds like a quick /uw/) and /y/ (which sounds like a quick /iy/).

Summary: The consonants of English

Classification of American English Consonant Phonemes							
Manner of Articulation	Place of Articulation						
	Bilabial	Labio-dental	Dental	Alveolar	Palatal	Velar	Glottal
Stop							
Voiceless	/p/			/t/		/k/	
Voiced	/b/			/d/		/g/	
Fricative							
Voiceless		/f/	/θ/	/s/	/ʃ/		/h/
Voiced		/v/	/ð/	/z/	/ʒ/		
Affricate							
Voiceless					/ʧ/		
Voiced					/ʤ/		
Nasal							
Voiced	/m/			/n/		/ŋ/	
Liquid							
Voiced				/l/	/r/		
Glide							
Voiced	/w/				/y/		

An almost-extinct consonant sound: /hw/

Most speakers of English today pronounce the first sounds in *weather* and *whether* in the same way: as the voiced glide /w/. However, until fairly recently, these were two separate sounds. Words like *weather, woman,* and *wish* started with a voiced /w/, and most words spelled with "wh," like *whether, which,* and *what,* started with a different sound, a voiceless glide that can be represented by the symbol /hw/. Gradually the /hw/ sound has been going out of use. Today the main areas where many people distinguish these two sounds are Scotland, parts of Ireland, and some parts of the Southern United States. In other areas, some speakers may differentiate between /w/ and /hw/, but most people don't. For pronunciation teaching purposes, it's not necessary to teach students to use the /hw/ sound unless your textbook teaches it.

Restrictions on where some consonants can occur

Most consonants can appear in all positions in words: At the beginning, in the middle, or at the end. However, some consonants cannot occur in all positions in words:

- **/ŋ/:** The consonant /ŋ/ cannot begin a word in English, but there are many words that have it in the middle or at the end: *singer, think, song, tongue*.
- **/ʒ/:** English has only a few borrowed words that begin with the consonant /ʒ/, (*genre* may be the only common one) and only a small number that end in this sound (*beige, garage, prestige*). It is more often found in the middle of words: *usual, measure, leisure, vision*.
- **/h/:** The sound /h/ cannot occur at the end of a word. When we see the letter *h* at the end of a word, it is either silent (*oh, hurrah*) or part of a two-letter combination that spells a different sound (*rich, fish, tooth*).

Syllabic consonants

In general, every syllable needs a vowel to serve as its "heart." However, sometimes we can have a syllable with no vowel if a consonant stretches out longer to replace the vowel. Only a few consonants are able to do this: /n/, /l/, and /r/.

The phonemes /n/ and /l/ most often become syllabic after a stressed syllable that ends in an alveolar consonant: *Kítten, bútton, dídn't, shóuldn't, kéttle, líttle, ládle, túnnel.* (Keep reading to find out about how the /t/ sound can change when a syllabic /n/ comes after it.)

In American English, /r/ often acts like a vowel sound in words like *her, learn, word, water,* and *butterfly*. In the syllables written in red in these words, we only hear the /r/ sound with no separate vowel before it. This is different from words like *wear, wore, hear,* or *tired,* where we can clearly hear a separate vowel before /r/. Many textbooks use the symbol /ɚ/ or /ɝ/ to represent this "syllabic /r/," while others use a double symbol like /ər/ or /ɜr/.

Allophones of some consonant phonemes

Some consonants are pronounced differently depending on where they are in a word and what sounds are around them. (That is, some consonant phonemes have more than one allophone, depending on their phonetic environment.) Let's look at the consonant variations in American English that are most important for you to know about as a teacher:

Allophones of voiceless stops: In English, the three voiceless stops, /p/, /t/, and /k/, have allophones that follow the same pattern. (The phoneme /t/ also has some extra allophones.)

When /p/, /t/, and /k/ come at the beginning of a word or at the beginning of a stressed syllable, they are **aspirated**. That is, they are pronounced with a small puff of air. We can

represent these sounds by adding a small “h” to the phonemic symbol:

- [p^{h}] *pan, price, potáto, appéar*
- [t^{h}] *top, táble, togéther, atténd*
- [k^{h}] *can, kéttle, compúter, accúse*

When /p/, /t/, or /k/ are in a consonant cluster after /s/ at the beginning of a word or syllable, they are **unaspirated**. There is no puff of air when we say them. To represent these sounds, we don’t add anything to their phonemic symbols.

- [p] *span, spécial, spring*
- [t] *stop, stáple, string*
- [k] *scan, scátter, screen*

When /p/, /t/, or /k/ comes at the end of a word, it is often (but not always) **unreleased**. This means that we start to say the sound by blocking off the air flow, but we don’t release the air. We add a small circle to the phonemic symbol to represent these sounds.

- [p˚] *stop, hope, devélop*
- [t˚] *coat, late, básket*
- [k˚] *back, lake, stómach*

(The rules we have just looked at only apply to voiceless stops (/p/, /t/, /k/). Voiced stops in English (/b/, /d/, /g/) are never aspirated. They don’t have a puff of air in any position.)

In addition to these sound variations that work the same way for all voiceless stops, in American English, /t/ has more allophones that /p/ and /k/ don’t have.

The first “extra” allophone of /t/ is the sound that we usually hear in American English in the middle of words like *water, city,* and *bottle*. This is a voiced sound. The tongue taps the alveolar ridge very quickly, so that it sounds like a quick /d/. It’s called an alveolar **flap** or **tap**, and it’s represented by this symbol: [ɾ]. It’s like the sound represented by the letter “r” in Spanish and many other languages, but it’s different from an English /r/. (For an English /r/, the tongue doesn’t touch the alveolar ridge. For the flap, it does.)

When words are pronounced with [ɾ], some words with /t/ sound just like words with /d/:

- *Látter* and *ládder* sound the same.
- *Wríting* and *ríding* sound the same.
- *Métal* and *médal* sound the same.

When do we pronounce /t/ as a flap? We say it this way only when two things happen:

- When /t/ comes between two vowels (or vowels followed by /r/).
- When the syllable before it is stressed, and the syllable after it is unstressed.

Look at the examples in the table below. When the stress is before the /t/ sound, it's a flap. When the stress is after /t/, /t/ is not a flap.

Examples of Flaps and Glottal Stops		
"normal" /t/	/t/ is a flap	/t/ is a glottal stop
betwéen	bútter	bútton
atómic	átom	sátin
fourtéen	fórty	impórtant
retúrn	rétícent	rétina
patérnal	páttern	pátent
máster	mátter	Manháttan

The second "extra" allophone of /t/ is a glottal stop, represented by this symbol: [ʔ]. To produce this sound, the vocal cords close tightly, air builds up behind them, and then they open quickly. It's like the beginning of a small cough, or the middle sound when we say *huh-uh* to mean "no."

The phoneme /t/ can be pronounced as a glottal stop when two things happen:

- When the syllable before it is stressed and the syllable after it is unstressed.
- When the syllable after it is /ən/ or syllabic /n/. (That is, /ə/ disappears and /n/ is lengthened and becomes a whole syllable. The symbol for syllabic /n/ is [n̩].)

Examples of words in which this happens are listed in the table above.

It's not absolutely necessary for learners to pronounce the flap [ɾ] or the glottal stop [ʔ] allophones of /t/, but they need to understand them when they hear them. And in normal American English speech, they will hear them often.

Light and dark /l/: The consonant /l/ is traditionally said to have two allophones: "light" or alveolar /l/ (with the symbol [l]) and "dark," or velarized /l/ (with the symbol [ɫ]), occurring in different positions:

- [l] (light /l/) is found at the beginning of a syllable, especially before front vowels, in words like *light, left,* and *believe.* It is pronounced with the tongue touching the alveolar ridge and the sides of the tongue open.
- [ɬ] (dark /l/) is found at the end of syllables and before back vowels, in words like *low, ball,* and *pool.* It is also pronounced with the sides of the tongue open, but with the tongue higher at the back of the mouth. The tip of the tongue might or might not touch the alveolar ridge. In some dialects, particularly some types of British English, dark /l/ sounds almost like /o/ or /u/.

However, in the speech of most Americans, the difference between these two allophones is small, and some Americans don't make this distinction at all. Instead, they pronounce a sound that's similar to a dark /l/, but with the tongue touching the alveolar ridge, in all positions. Because of this, if your pronunciation model is American English, the distinction between dark and light /l/ does not need to be a high priority. You and your students have more important things to think about.

Consonant Clusters

Consonant clusters are groups of two or more consonant sounds in a row, as in *spot, strong, desk, desks,* or *sister*. It's important to remember that we're talking about groups of consonant *sounds,* not consonant *letters*. These are not always the same thing. For example, *ship* and *sing* each have groups of two consonant letters, but each group represents only one sound (*sh* = /ʃ/ and *ng* = /ŋ/). On the other hand, the letter *x* as in *six* represents a consonant cluster of two sounds: /ks/.

Consonant clusters in English can occur at the beginning, middle, or end of words. There are restrictions on how many consonants can occur in a particular position, and which consonants can occur together. For example, /sk/ as in *sky,* /pl/ as in *play,* and /spr/ as in *spring* are all possible consonant combinations at the beginning of a word in English, but /sd/, /fp/, and /zpr/ are not. There just aren't any words that start with those combinations of sounds.

At the beginning of words: In English, we can find words and syllables that begin with one, two, or three consonants, but never more than three.

In initial clusters with **two consonants,** we can find the combinations listed in the table below. Notice that while some of these words begin with only one consonant *letter,* they actually have two consonant *sounds*. For example, *cute, beauty, pure, few,* and *huge* all begin with one written consonant, followed by an "invisible /y/" and the vowel sound

/uw/. We hear a /y/ sound, which counts as a consonant, even though there's no letter *y*. (For example, *cute* is pronounced /kyuwt/, not /kuwt/.) In words like *quick, quiet,* and *question,* the letters *qu* stand for the consonant cluster /kw/.

Two-consonant clusters		
First Sound	**Second Sound**	**Examples**
/p/	/l/, /r/, /y/	Play, pray, pure
/b/	/l/, /r/, /y/	Blue, brown, beauty
/t/	/l/, /r/, /w/, /y/	True, twin, (tune)
/d/	/l/, /r/, /w/, /y/	Draw, dwell, (due)
/k/	/l/, /r/, /w/, /y/	Close, crowd, queen, cure
/g/	/l/, /r/, /w/	Glow, green, [Gwen]
/f/	/l/, /r/, /y/	Fly, free, few
/θ/	/r/, /w/	Three, [thwart]
/s/	/l/, /w/, /m/, /n/, /p/, /t/, /k/	Sleep, swim, smile, snow, speak, stop, skate
Words in ( ) = Many people pronounce these them without /y/. Words in [ ] = Very few words begin with this combination.		

When **three consonants** come together at the beginning of a syllable, we find fewer possible combinations. The first consonant is always /s/, the second is a voiceless stop, and the third is a liquid or glide. However, not all of these combination actually occur, and some are very uncommon. The table below lists possible three-consonant combinations at the beginning of syllables.

Three-consonant clusters			
First Sound	**Second Sound**	**Third Sound**	**Examples**
/s/	/p/	/l/, /r/, /y/	Splash, spring, spew
	/t/	/r/, /y/	String, (stew, stupid)
	/k/	/l/, /r/, /w/, /y/	[Sclerosis], scrap, squirrel, skewer
Words in ( ) = Many people pronounce these them without /y/. Words in [ ] = Very few words begin with this combination.			

At the ends of words, we can have one, two, three, or four consonants together. Some of the longer clusters are in words with the grammatical endings *-s* or *-ed*, which add an extra sound. Here are some examples of words ending in two-consonant clusters:

> *help, felt, old, milk, shelf, curb, art, cord, mark, bump, ant, hand, tense, ranch, sink, else, bulge, course, march, arm, barn, girl, wasp, trust, ask, soft, act, tax, fourth*

Here are examples of words ending in three-consonant clusters:

> *text, sixth, exempt, waltz, world, glimpse, quartz, against*

Some words end in four-consonant clusters because a grammatical ending has been added:

> *texts, sixths, exempts, waltzed, worlds, glimpsed*

Simplification of consonant clusters

We generally encourage students to pronounce every sound in a consonant cluster. However, there is one situation when it's acceptable to simplify a consonant cluster, that is, to omit one of the consonants. When there are three or more consonants in a row, the *middle* one is sometimes dropped. (The first or last consonant is *not* dropped.) This happens most often when the middle consonant is a stop, /θ/, or /ð/. For example:

- *tests* might sound like /tɛsts/ or /tɛs/
- *asked* might sound like /æskt/ or /æst/
- *months* might sound like /mʌnθs/ or /mʌns/
- *sixths* might sound like /sɪksθs/ or /sɪks/

Native speakers are often not aware that they're omitting these sounds. However, these pronunciations are very common and are found in all but the most careful types of speech.

Another way native speakers make consonant clusters easier to pronounce is by **resyllabification.** That is, they split up a consonant cluster so that the last consonant in the cluster joins the syllable after it. For example, when we say: *The cats are sleeping,* the final /s/ in *cats* sounds like it joins the following word: *The cat sare sleeping*.

Some learner problems with consonants

Learners' problems in pronouncing new sounds vary depending on the sound system of their native language. To predict the kinds of problems their students might have, teachers need at least a basic knowledge of the sound system of the learners' language. But whatever the student's language, the general types of problems can be similar. Some sources of problems can be:

New sounds: When learners try to pronounce a sound that doesn't exist in their own language, it's naturally difficult, and they may substitute a similar (but not identical) sound from their own language. For example, many languages don't contain the phonemes /θ/ or /ð/, so speakers of those languages often have a hard time hearing and distinguishing these new sounds. When they try to say the new sounds, they often substitute more familiar sounds, like /s/, /f/, or /t/ for /θ/ and /z/, /v/, or /d/ for /ð/. It's important to help students hear and understand that there actually *is* a difference between the new sounds and the familiar first-language sounds so they can begin to pronounce the new sounds more accurately. If we allow learners to assume that the new sounds are identical to sounds in their own language, they will have little chance of pronouncing new sounds well.

Familiar sounds in unfamiliar environments: There can also be sounds that are easy for learners to pronounce in some phonetic environments, but difficult in others. For example, the glide /w/ is not a serious problem for Japanese or Korean speakers when followed by most vowels. Saying *wet, way,* or *wine* is not hard. However, when /w/ is followed by /uw/ or /ʊ/, it's more of a problem. Words like *woman, wood,* and *woo* are a pronunciation challenge. This is because those languages have sound combinations similar to /wi/ /we/, and /wa/, but not combinations like /wu/. The fact that the sounds of /w/ and /uw/ are very similar can also make it hard for learners to pronounce them in sequence, and *wood* can end up sounding like /uwd/. The same situation happens with /y/ before the similar vowel sounds /iy/ and /ɪ/. It's hard for many learners to distinguish *year* and *ear* or *yeast* and *east*.

Final consonants: Consonants at the ends of words are often more troublesome than the same consonants at the beginnings of words. This is especially true for students whose native language does not allow any consonants at the ends of words, or perhaps only a limited set of consonants.

When learners have trouble pronouncing final consonants, they cope in different ways, depending partly on their language background. Speakers of some languages tend to omit final consonants. For example, they might pronounce *meet* as /miy/ or *back* as /bæ/. Speakers of other languages might add an extra vowel after the final consonant, pronouncing *meet* as /miytə/ or *back* as /bæku/.

Another problem with final consonants affects speakers of languages such as German and Russian, where final stops, fricatives and affricates (together called **obstruents**) are always voiceless, even if they're spelled with letters that normally represent voiced sounds. For example, the German word *Hand* (meaning *hand*) is pronounced /hant/, not /hand/. When speakers of these languages pronounce English words that end in voiced obstruents, they

may substitute voiceless sounds instead.

Because all these changes fit the familiar patterns that the learners are used to using in their own language, they don't realize that they're changing anything. They unconsciously reshape new words to fit the comfortable pattern of their own language.

Consonant clusters: Languages also have different restrictions on what kinds of syllables and consonant combinations are possible. Some languages don't have consonant clusters at all. Others have fewer clusters than English, or they allow different combinations of consonants. Learners whose languages have different syllable structure rules than English may have trouble pronouncing some words with consonant clusters.

Learners cope with unfamiliar consonant clusters in different ways. They might omit one or more of the consonants. For example, they might pronounce *section* as /sɛʃən/ or *spring* as /spɪŋ/ or /pɪŋ/. Other learners add an extra vowel before or between the consonants. For example, *school* might become /ɛskuwl/ or *spring* might become /sʊpʊrɪŋ/.

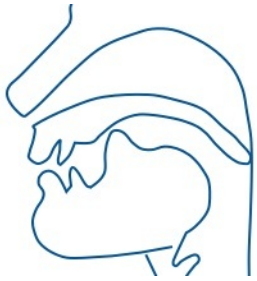
All of these are changes that learners unconsciously produce to make words more comfortable and easier to pronounce. However, they also make it much harder for listeners to understand what the speaker is trying to say. Teachers need to help students understand and practice the patterns of English syllable structure to make their speech more understandable.

Some consonant sounds that often cause problems

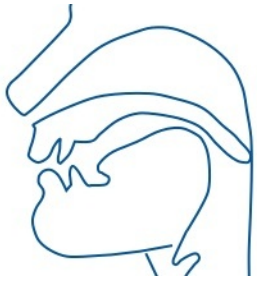
Let's look in more detail at a few of the consonant sounds that are difficult for some learners.

/r/: When pronouncing /r/, the lips are a little bit rounded, and the tip of the tongue does not touch the roof of the mouth. (This is different from sounds spelled with the letter *r* in some other languages. The /r/ sound in both American and British English is *not* a **flap** or a **trill**, as it is in Spanish, Russian, Arabic, and many other languages.)

Some speakers of English pronounce /r/ with the tip of the tongue curled up a bit. Others say it with the back of the tongue pulled back and bunched up, without curling the tip. Both ways can produce the same sound, and students should use the way that produces the best results for them.



/r/ with the tongue curled



/r/ with the tongue pulled back

/l/: As we read earlier, when we say /l/, the tip of the tongue touches the alveolar ridge, but the sides of the tongue are open, so air can flow around the tongue. Unlike /r/, the lips are not rounded when we say /l/.

Here's one way to feel the difference between /r/ and /l/: Say /r/ and stop in the middle of the sound, keeping your mouth and lips in position. Then breathe in hard. The air rushing into your mouth should make the *underside of the tip of your tongue* feel cold. Now say /l/, again stopping in the middle of the sound and breathing in. Now the *sides* of your tongue should feel cold air. If a different part of your tongue feels cold, something may be wrong.

Learners can also check their pronunciation using a mirror. When they say /r/, their lips should be a bit rounded, and they should be able to see a little of the underside of their tongue. When they say /l/, their lips should not be rounded, and they should see just the tip of their tongue.

/f/ and /v/: In pronouncing both /f/ and /v/, the top teeth gently touch just inside the lower lip, and air passes out under the teeth. Many students have been told to "bite their lip" when they say /f/ and /v/. This gives them a rough idea of where to put their teeth and lower lip, but it's a bit extreme for real speech. If students put their teeth too far forward on their lower lip or bite too hard, it will be hard to get enough air coming through to make the sound properly.

Usual pronunciation of /f/ or /v/

"Bite your lip." This is too much.

Speakers of languages that do not have labiodental sounds may substitute the bilabial /b/ for /v/, and some also substitute /p/ for /f/. If this happens, and the speaker's lips really want to close when they say /f/ or /v/, have them put a finger on their top lip to hold it up out of the way. This makes it easier for just the top teeth to touch the lower lip.

If students look in a mirror while saying /f/ or /v/, they should be able to see their teeth just a bit. If their lips are closed, or if they're too close together to see their teeth, they're not saying the sounds correctly.

/θ/ and /ð/: In pronouncing /θ/ and /ð/, the tip of the tongue gently touches the back or bottom of the top teeth. For these sounds, students may have been told to "bite your tongue" or "stick out your tongue." Again, this is a good hint for giving students a feeling of where to put their tongues, but in normal speech, the tongue doesn't stick all the way out of the mouth.

Usual pronunciation of /θ/ or /ð/

"Bite your tongue." This is too much.

When looking in a mirror while saying /θ/ or /ð/, you should see just a bit of your tongue, not your whole tongue sticking out.

Learning to pronounce new consonant sounds can be challenging, and it won't happen all at once. It takes time for students to learn to recognize new sounds and get used to moving their mouths in strange new ways to produce them.

Sagittal section diagrams for English consonants

/p/ (pan), /b/ (boy)

/t/ (time) and /d/ (dime)

/k/ (cap) and /g/ (gap)

/f/ (fan) and /v/ (van)

/θ/ (thick) and /ð/ (the)

/s/ (sue) and /z/ (zoo)

/ʃ/ (ship) and /ʒ/ beige

/h/ (house)

/ʧ/ (chip) and /ʤ/ (jam)

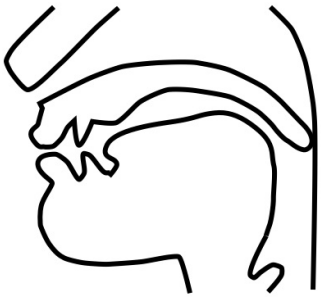
/m/ (man)

/n/ (no)

/ŋ/ (sing)

/l/ (land)

one way to pronounce /r/ (road)



/w/ (win)

/y/ (yes)

3. The phonology of English vowels: an introduction

Before you study this chapter, check whether you are familiar with the following terms: back, central, close, consonant cluster, diphthong, front, full vowel, half-close, half-open, high, lax, low, manner of articulation, mid, monophthong, open, place of articulation, rounded, schwa, stress, suffix, syllable, tense, triphthong, unrounded, vowel shift, weak vowel

In this chapter we take a look at English vowel sounds and their possible classifications, compare them with the Hungarian vowel system and see what typical vowel alternations occur in English.

Vowels differ from consonants in two very important ways: they are articulated without any kind of obstruction in the oral cavity – i.e., the articulators do not form a complete or partial closure or a narrowed passage in the way of the exhaled air. On the other hand, vowels differ from consonants in their behaviour, too: while consonants typically occur in syllable marginal positions – they appear at the peripheries of the syllable –, vowels form the very core of the syllable and occur in syllable central position.

As suggested in Chapter 1, vowel sounds may be classified according to two types of factors: phonetic and phonological. In the first case, classification is based on some articulatory characteristics while in the second it is some aspect of vowel behaviour that serves as the basis for classification.

Let us first examine what **phonetic classes** may be defined in the English vowel system. In some vowels the position of the tongue is relatively stable during articulation; such vowels are called **monophthongs**. In other vowels, though, the position that the tongue occupies at the beginning of the vowel differs significantly from what it occupies at the end of the vowel; i.e.,

some tongue movement is involved. Such vowels are referred to as **diphthongs** (and **triphthongs**). We may also think of this difference as a difference in how many vowels are found within one syllable: in monophthongs there is one – e.g., /ɪ, e, ʊ, ɔː, ɑː/ –, in diphthongs there are two – e.g., /aɪ, eə, əʊ/ – while in triphthongs there are three – e.g., /aɪə, aʊə/. Note though that triphthongs are not found in all dialects of English: those dialects that pronounce all underlying /r/'s – the so-called rhotic dialects, cf. Chapter 2 – typically lack triphthongs – and even some of the diphthongs as we will show in Chapter 4.

On the other hand, vowels may be short – e.g. /ɪ, e, ʊ/ – or long – e.g., /ɔː, ɑː, eə, əʊ, aɪə/ – depending on their **duration**: long vowels are approximately twice as long as short ones. Note that diphthongs and triphthongs are just as long as long monophthongs. Whenever we refer to long vowels, we always mean long monophthongs, diphthongs and triphthongs together. Note that length in English varies depending on the environment – i.e., length is not a stable property. For more on length alternations, see Chapter 6. The vowels of RP are the following:

Short vowels	Long vowels		
ɪ, ʊ, e, ɒ, ʌ, æ	ɑː, iː, uː, ɔː, ɜː	eɪ, aɪ, ɔɪ, aʊ, əʊ, ɪə, eə, ʊə	aɪə, aʊə
Monophthongs		Diphthongs	Triphthongs

To further demonstrate that length is not a purely phonetic property of English vowels, we may refer to the **controversy of length marking**: the vowel length of monophthongal – or pure – vowels is indicated with a colon. However, one of the so-called short monophthongs, the vowel /æ/ is just as long in actual pronunciation as any of the long monophthongs or diphthongs and it even undergoes the very same shortening process as long vowels do

(see Chapter 6). However, its length is not indicated in transcription with the colon. The vowel /æ/ is categorized as a short vowel because it behaves like other short vowels do. The phonetic length of /æ/ may be due to the fact that during its production the lower jaw and the tongue are in their most open position, a gesture which might take long enough to cause a perceivable length difference.

Another important note concerning vowel length is due here: while most Hungarian **short-long vowel pairs** consist of vowels of more or less the same quality with just a length difference (e.g., /y/-/yː/ *tüze* 'his/her/its fire' vs. *tűz-e* 'does he/she/it stitch?', /ø/-/øː/ *kör* 'circle' vs. *kőr* 'hearts (in cards)', /i/-/iː/ *Sirok* (a placename) vs. *sírok* 'I cry'), English short-long vowel pairs always involve a quality difference, that is, there is no English short-long vowel pair in which the qualities of the two vowels are the same. This is also reflected in the phonetic symbols used to indicate them. Consequently, while there is a short /ɪ/ and a long /iː/, there is no /ɪː/; similarly, while there is a short /ʊ/ and a long /uː/, there is no /ʊː/. The only exception to this rule is the vowel pair /ə/-/ɜː/, mentioned in Chapter 1, where the quality of the vowels is the same. However, in this case it is the full vowel-weak vowel distinction, to be discussed presently, that justifies the use of the different symbols.

As far as **phonological classifications of vowels** are concerned, the two major phonological classes are based on the type of syllable the vowel appears in. English behaves quite differently from Hungarian as far as stressed and unstressed syllables are concerned. On the one hand, while it is always the first syllable of the word that carries the main stress in Hungarian, it may be the first, second, third, etc. syllable of an English word that carries primary stress.[1] On the other hand, English unstressed syllables have **reduced**

[1] For the degrees of stress, see Chapter 8.

vowels only, in the sense that these vowels are shorter, weaker in energy and closer to schwa /ə/ in place of articulation. Thus, in unstressed syllables only weak vowels – /ə/, /ɪ/ and /ʊ/ – may be found while in stressed syllables we may only find so-called **full vowels** – i.e., all the other vowels of English, also including /ɪ/ and /ʊ/, which, besides occurring in unstressed syllables, may also function as full vowels.

Within the class of full vowels we may distinguish two subclasses: **tense and lax vowels**. One has to be very careful when using these two terms as they are often used as phonetic labels, too. In a phonetic sense, these terms refer to the muscle bundles located at the backmost part of the tongue, against the back wall of the pharynx (throat). Whenever these muscles are tense, the vowel is tense (in a phonetic sense); when such muscle tenseness is not present, the vowel is lax (phonetically). However, we will use these terms in a purely phonological sense, i.e., to refer to a certain kind of vowel behaviour. (We might just as well call the two types of vowel Type1 and Type2 was it not for our wish to follow the tradition.) As we will show below, tense and lax vowels (in a phonological sense) occur in different types of environment.

	Tense	Lax
Monophthongs	iː, uː, ɔː[3]	ɪ, e, æ, ʌ, ʊ, ɒ, ɑː, ɜː, ɔː[1], ɔː[2]
Diphthongs and triphthongs	aɪ, eɪ, ɔɪ, aʊ, əʊ, ɪə, eə, ʊə, aɪə, aʊə	

There are a few generalizations to be drawn on the basis of the above table: all short vowels are lax and all diphthongs and triphthongs are tense while long monophthongs are divided between the two classes. Non-high long monophthongs – that is /ɑː/, /ɜː/ and /ɔː/ – are lax, except in the case of /ɔː/[3].

The behaviour of /ɔː/ is twofold: sometimes it is tense, in other cases it is lax. There are two general types of spellings that indicate a lax /ɔː/ while a further set of spellings represents the tense variant.

/ɔː/[1]	Lax	No <r> in spelling	*ball, called, saw, bought, broad, Shaw, clause, fault*
/ɔː/[2]		<ar> or <or> in spelling in word-final position or followed by a consonant letter	*for, horde, morning, gorgeous, cord, north, war, dwarf, quarter, horn, sport*
/ɔː/[3]	Tense	<or> in spelling followed by a (pronounced or silent) vowel letter	*before, historian, store, more, adore, bored, shore*
		<oar>, <oor>, <our>, <aur> in spelling	*soar, boar, roar, door, floor, four, pour, aura, Laura*

The behaviour and alternations of tense and lax vowels are discussed below and also in Chapter 4, where we take a look at their behaviour before <r>. The following table sums up what we have discussed about the manner of articulation and the behaviour of vowels so far.

	Full vowel			Weak vowel
	lax		tense	
	short	long	long	
Monophthong	ɪ, e, æ, ʌ, ʊ, ɒ	ɑː, ɜː, ɔː	iː, uː, ɔː	ɪ, ʊ, ə
Diphthong	-	-	aɪ, eɪ, ɔɪ, aʊ, əʊ, ɪə, eə, ʊə	-
Triphthong	-	-	aɪə, aʊə	-

Let us now turn to the **places of articulation of vowels**. Before we actually discuss these we have to point out that places of articulation are not as clearcut for vowels as for consonants for the very simple reason that while in consonants the place of articulation refers to the articulators producing some

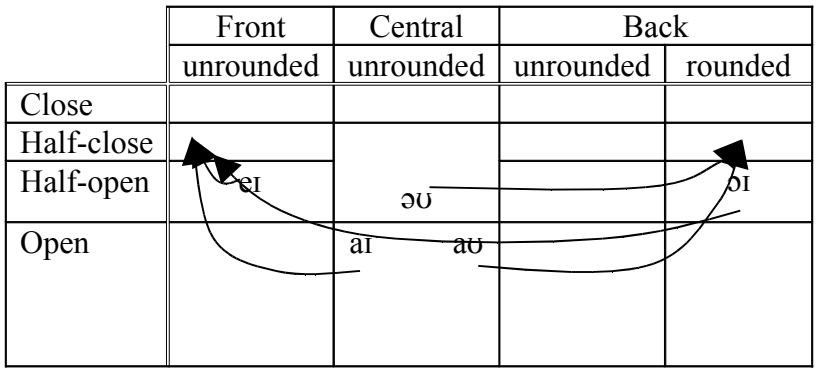
degree of obstruction, in vowels it is simply inapplicable as they do not involve any kind of obstruction. Instead of referring to obstruction sites, we will use three criteria to classify vowels according to horizontal tongue position, vertical tongue position and lip rounding.

The **places of articulation of the monophthongs** of RP are the following:

	Front	Central	Back	
	unrounded	unrounded	unrounded	rounded
Close	/iː/ *beat*	-	-	/uː/ *boot*
Half-close	/ɪ/ *bit*	/ə/ *ago*	-	/ʊ/ *put*
Half-open	/e/ *bet*	/ɜː/ *burn*	-	/ɔː/ *bought*
Open	/æ/ *bat*	/ʌ/ *but*	/ɑː/ *bar*	/ɒ/ *Bob*

We have to note that besides the terms used in the table above, close vowels are often referred to as **high**, open vowels as **low**, while the ones inbetween as **mid**. As it can be seen from the above table the following generalizations may be drawn: front and central vowels are unrounded while back vowels are rounded, except for /ɑː/.

The **places of articulation of the diphthongs** of RP are the following:



	Front	Central	Back	
	unrounded	unrounded	unrounded	rounded
Close				
Half-close	ɪə			ʊə
Half-open	eə			
Open				

/ɪə/ *beer*

/eə/ *bear*

/ʊə/ *boorish*

Diphthongs may be classified according to several factors. On the one hand, we may distinguish them according to their second component: if it is a schwa /ə/, then we talk about **centring diphthongs**. In all other diphthongs the second component is more close than the first, and these are thus called **closing diphthongs**; those that end in /ɪ/ are **fronting** (and closing) while those ending in /ʊ/ are **backing** (and closing). On the other hand, closing diphthongs may be classified according to the articulatory distance between the two components: the diphthongs /eɪ/, /əʊ/ are **narrow** (and closing), while the rest, /aɪ/, /aʊ/, /ɔɪ/ are the so-called **low-starting** or **wide diphthongs**. This is summarized in the table below:

	Centring	Closing	
		Fronting	Backing
Narrow	ɪə, eə, ʊə	eɪ	əʊ
Wide	-	aɪ, ɔɪ	aʊ

As shown in the following table, unlike English, Hungarian also has front rounded vowels. In addition, Hungarian back vowels are all rounded – note that /aː/ is a central vowel. Attention must also be paid to the fact that the traditional **Hungarian terminology** might be misleading: the so-called "magas (hangrendű)" vowels are actually front – and not high –, while "mély (hangrendű)" vowels are central or back – and not low –, i.e., *magas* and

mély do not refer to tongue height, but are metaphors for the acoustic effect made by the vowel.

The **places of articulation of Hungarian vowels** are the following:

	Front		Central	Back
	unrounded	rounded	unrounded	rounded
Close	/iː/ *hív* /i/ *ki*	/yː/ *tűz* /y/ *üt*	-	/uː/ *út* /u/ *kulcs*
Half-close	/eː/ *kér*	/øː/ *nő* /ø/ *kör*	-	/oː/ *tó* /o/ *hoz*
Half-open	/ɛ/ *kert*	-	-	-
Open	-	-	/aː/ *ház*	/ɒ/ *kar*

Let us now turn back to phonology and the discussion of tense and lax vowels. One of the differences between them is in what positions they may appear in a word. In English, unlike in Hungarian, when a word is suffixed, often it is the pronunciation of the word stem that changes and not that of the suffix. One such alternation involves the change of an original tense vowel into a lax one. The phenomenon is called **vowel shift**, a historical version of which – the Great Vowel Shift – applied to English long vowels around the 15th century.

The vowel shift is thus a case of tense-lax alternations. Tense vowels of word stems become lax in certain environments. The tense-lax vowel pairs are as follows:

Regular type		Vowel letter		Before R
1. /eɪ/-/æ/	*grade-gradual* *sane-sanity* *vane-vanity*	**A**	*compare-comparison* *prepare-preparatory* *barbarian-barbaric*	1. /eə/-/æ/
2. /iː/-/e/	*meter-metric* *secret-secretary* *keep-kept*	**E**	*imperial-imperative* *severe-severity* *hero-heroine*	2. /ɪə/-/e/
3. /aɪ/-/ɪ/	*final-finish* *decide-decision* *Bible-biblical*	**I** or **Y**	*satire-satirical* *tyrant-tyranny* *lyre-lyrical*	3. /aɪə/-/ɪ/
4. /əʊ/-/ɒ/	*holy-holiday* *know-knowledge* *sole-solitude*	**O**	*historian-historical* *explore-exploratory* *flora-florist*	4. /ɔː/-/ɒ/

There are two types of word pair: one in which the stressed vowel is followed by the letter <r> and one in which it is not. As vowels may be influenced by a following <r> – Pre-R Breaking for tense vowels and Pre-R Broadening for lax vowels, for details see Chapter 4 – we have to consider pre-R cases separately. Note that in the examples relevant to the present discussion, Pre-R Breaking does apply for tense vowels (that is, tense vowels differ according to what follows them) but Pre-R Broadening does not (that is, the same lax vowels appear in both the first and the last columns of the table).

It is also clear from the table that some of the tense vowels, namely /(j)uː/, /ɔɪ/, and /aʊ/ have no lax counterparts and as a result do not participate in the alternation (they are **non-laxable**). There are a few untypical pairings that may occur: /aʊ/-/ʌ/ *pronounce-pronunciation*, /ɔɪ/-/ʌ/ *join-juncture,* /uː/-/ʌ/ *do-does*, etc. Also, there are a few cases that involve some alternation but

it is either not one of the regular vowel pairs above – e.g., /ɪə/-/æ/ *cl<u>ea</u>r-cl<u>a</u>rity*, /eɪ/-/e/ *br<u>ea</u>k-br<u>ea</u>kfast* – or they involve lax-lax or tense-tense alternations – /ɑː/-/e/ *ex<u>a</u>mple-ex<u>e</u>mplify*, /aɪə/-/ɪə/ *emp<u>i</u>re-imp<u>e</u>rial*. Let us now turn to the environments in which vowel shift may occur.

Probably the most influential such **laxing process** is **Trisyllabic Laxness**, in which a stressed vowel in (at least) the third-last syllable must be lax – e.g., *s<u>a</u>ne-s<u>a</u>nity, gr<u>a</u>de-gr<u>a</u>dual, comp<u>a</u>re-comp<u>a</u>rison*. As we have noted above, this rule has regular exceptions: the tense vowels /uː/, /juː/ and their variants /ʊə/, /jʊə/ are regular exceptions, i.e., they freely occur in trisyllabic environments, e.g., *<u>u</u>nity, p<u>u</u>rify, st<u>u</u>pefy*. Besides these, there are irregular exceptions, too. In a few cases other tense vowels may also occur in trisyllabic environments, e.g., *n<u>i</u>ghtingale, <u>A</u>braham, n<u>o</u>tify, <u>i</u>solate*. What makes this rule problematic is that there is a great number of exceptions, both regular and irregular. Also, the rule is sensitive to the morphological structure of the word: it applies if certain suffixes are attached to the stem but not if others are added. That is, it seems that the syllables of certain suffixes are counted when we count the three syllables from the end of the word while others are not. Whether to count the syllables of the suffix or not depends on whether the suffix is a regular, **productive suffix**, which can be added to almost all members of a category (noun, verb, adjective, etc.) to produce a large number of words, or a **non-productive suffix** which is only added to certain stems of a class and therefore has fewer examples. Some of the typical examples of the two suffix classes are shown in the following table.

Productive suffixes not counted in Trisyllabic Laxness		Non-productive suffixes counted in Trisyllabic Laxness	
-ness	*lazy-laziness, tidy-tidiness*	*-ity*	*grave-gravity, sane-sanity*
-ly	*total-totally, lazy-lazily*	*-al*	*crime-criminal*
-ary/-ery/-ory	*advise-advisory*	*-ative*	*provoke-provocative*
-ing	*pilot-piloting*	*-ible*	*divide-divisible, eat-edible*

We must mention here that Trisyllabic Laxness is not just an active phonological rule that applies to certain roots if they are followed by certain suffixes but also a so-called **morpheme structure condition**, a passive constraint that requires that a stressed vowel which is in at least the third syllable from the end of the word must be lax – even if no suffix is added to it.

/æ/	/e/	/ɪ/	/ɒ/
animal, stamina, fantasy, cannibal, janitor, character	*penetrate, separate, demonstrate, several, decorate, intelligent*	*irritate, miracle, similar, limerick, stimulate, frivolous*	*opera, positive, sonorant, homonym, dominate, oracle*

/ʌ/	/ɜː/	/ɑː/	/ɔː/
company, gullible, succulent, Gulliver	*terminal, permanent, pertinent, courtesy*	*participle, harmony, carnival, parsimony*	*orthodox, auditor, audible, autism*

Short /ʊ/ is missing from the charts above simply because it is so rare in present-day standard English that it is almost impossible to find relevant examples, e.g., *bulletin*.

Another laxing process applies if a so-called **laxing ending** is added to the word stem: a stressed syllable followed by one of the laxing endings must be lax. Examples include monosyllabic suffixes typically spelled with <i> or <e>: e.g., *-ic, -ish* (n/v), *-id, -it, -et, -el,* as in *m<u>e</u>tre-m<u>e</u>tric, f<u>i</u>nal-f<u>i</u>nish, sat<u>i</u>re-sat<u>i</u>rical*, etc. As indicated in brackets, *-ish* (n/v) is a laxing ending only if the word ending in *-ish* is a noun or a verb. However, if it is an adjective, the ending is non-laxing and the preceding stressed vowel may remain tense. Compare the sample words *f<u>i</u>nish* (n/v), *v<u>a</u>nish* (v) and *gr<u>ee</u>nish* (adj), *Sw<u>e</u>dish* (adj). The first two examples are nouns and verbs and thus the stressed vowel must be lax as opposed to the other two examples which are both adjectives and, as a result, the suffix does not influence the pronunciation of the stressed vowel.

Just as in the case of trisyllabic laxness, there are exceptions to this laxing rule, too. On the one hand, the vowels /uː/, /juː/ and their variants /ʊə/, /jʊə/ are regular exceptions; stressed /uː/ and /juː/ vowels are not affected by this laxing process: *c<u>u</u>be-c<u>u</u>bic, st<u>u</u>pe-st<u>u</u>pid, C<u>u</u>pid*. There are irregular exceptions as well; some roots resist laxing, e.g., *b<u>a</u>se-b<u>a</u>sic*. It is important that this rule does not only apply if the endings are separate morphemes attached to a root but also if they are just part of the root. For instance, the ending *-ic* causes the laxness of the stressed vowels in the names *<u>E</u>ric, P<u>a</u>trick* although the very same stressed vowels would be tense where they are followed by some other kind of ending, e.g., *<u>e</u>ra* [ˈɪərə], *p<u>a</u>tron* [ˈpeɪtrən]. It is clear then that this rule is not just an active phonological rule but also a **letter-to-sound rule** that determines how letters must be pronounced depending on the environment.

The third relevant laxing rule is triggered by the presence of a consonant cluster – a sequence of at least two consonants – immediately after the stressed vowel, and thus a stressed vowel followed by at least two

consonants must be lax: e.g., *interv<u>e</u>ne- interv<u>e</u>ntion, rec<u>ei</u>ve-rec<u>e</u>ption*, etc. This regularity is sometimes dubbed **Pre-cluster Laxness**.

There are two more rules that may cause the laxness of a vowel but they are clearly not phonological rules but letter-to-sound rules, that is they tell us how to pronounce vowel letters in certain environments in spelling. For this reason we just mention them here very briefly and they will be discussed in detail in Chapters 11-12, where we discuss letter-to-sound rules exhaustively.

The first such rule is **Laxing by free U**, which requires that if the stressed syllable is followed by a free U – roughly, a letter U followed by a vowel letter (as in *venue, statue*) – then the stressed vowel must be pronounced lax, e.g., *gr<u>a</u>de-gr<u>a</u>dual, r<u>i</u>te-r<u>i</u>tual*, etc. Just like in all other laxing rules, the vowels /(j)uː/ and /(j)ʊə/ are regular exceptions, they stay tense before a free U, e.g., *<u>u</u>se-<u>u</u>sual*.

The other letter-to-sound rule causing laxness is the so-called **CiV Laxing rule**, which forces a stressed vowel letter – spelled with <i> or <y> – to be pronounced lax /ɪ/ when followed by a consonant letter, another letter <i> and one more vowel letter. That is, the stressed vowel letter <i/y> is followed by the CiV configuration in spelling, hence the name of the rule, e.g., *dec<u>i</u>de-dec<u>i</u>sion, rev<u>i</u>se-rev<u>i</u>sion, <u>i</u>diot, fam<u>i</u>liar*, *S<u>y</u>ria*, etc. It is important to note that all the other vowel letters undergo **CiV Tensing** in the same environment, i.e., other vowel letters must be pronounced with a tense vowel, e.g., *m<u>a</u>nic-m<u>a</u>nia, Alb<u>a</u>nia, C<u>e</u>lia, Gl<u>o</u>ria, s<u>e</u>nior, r<u>a</u>dio*, etc. Interestingly, this rule is able to block the application of the laxing rules. In all the sample words above the stressed vowel is the third-last vowel from the end of the word, still, Trisyllabic Laxness does not apply and make them lax. The reason for this is that CiV tensing is more powerful and robust than the laxing rules, and thus it can override their effect. Of course, there are exceptions to the

CiV tensing rule as well, in which the stressed vowel is lax even though it is followed by CiV, e.g., *national, special, Italian*, *Daniel*, etc.

Besides CiV Tenseness, there is another regularity in English which requires a vowel in a certain position to be tense. It is called **Prevocalic Tenseness**, as its effect is to ensure that all stressed vowels preceding other vowels are tense. The situation when two separate vowels (the centres of their respective syllables) are adjacent is generally referred to as **hiatus**, e.g., the underlined portions of *Noam, Leo, hiatus*. Prevocalic Tenseness does nothing but describe the observation that in English the first member of a hiatus, if stressed, is always tense, namely /əʊ iː aɪ/ in the examples above. Note that it does not apply to unstressed vowels, e.g., *react*, which are of course reduced. In addition, it is only relevant to pronunciation: compare *Leo* to *mean* or *people* – the underlined vowel letter is pronounced as a separate sound in *Leo* only, in the others it combines with the following vowel letter to represent a single sound. That is, in *mean* and *people* there is no hiatus, and consequently Prevocalic Tenseness is not applicable.

Similarly to CiV Tenseness, Prevocalic Tenseness is also stronger than the laxness rules: in *variety*, for instance, either Trisyllabic Laxness or Prevocalic Tenseness could in principle take effect, but it is the latter that "wins".

In this chapter we saw that, although sometimes English chooses a tense vowel systematically, in many situations tense vowels are replaced by their lax counterparts. There are numerous examples where the originally tense stressed vowel becomes lax although none of the above environments may be blamed for the change. In such cases we may only say that these are unexplained, idiosyncratic cases of vowel shift, the surviving effects of older rules which are no longer active in the language, e.g., *read* (present)-*read* (past)*, life-live* (v)*, shade-shadow, mead-meadow.*

Although the above discussion of the phonetic and phonological classification of vowels concentrated on RP, most of it is valid in the case of GA, too. The tense-lax distinction applies to GA in the same way, together with the tenseness and laxness rules, with just a handful of examples where the two dialects diverge, e.g., *apricot*, pronounced (irregularly) with /eɪ/ in RP but very often (conforming to Trisyllabic Laxness) with /æ/ in GA. There are only a few minor differences in the vowel inventories, e.g., recall from Chapter 1 that all RP /əʊ/'s correspond to /oʊ/ in GA. Some of these also affect the classification of vowels, e.g., RP /ɒ/ in *lot, odd, wash* is usually long and unrounded /ɑː/ in GA, still, the vowel behaves as lax in the same way in the two accents: cf. *tone – tonic* RP /təʊn/ – /ˈtɒnɪk/, GA /toʊn/ – /ˈtɑːnɪk/, etc. As we will see in the next chapter, the rest of the dialectal deviations are caused by the differing distribution of /r/.

Syllabification

LING 451/551

Winter 2011

Syllable structure

- Predictable
  - Languages generally lack minimal pairs
    - *[a.tra] vs. [at.ra] (within same language)
- Rules of syllabification
  - partly universal
    - σ Assignment (Hayes)
    - Onset Formation
  - partly language specific

σ Assignment

- < Hayes
- “Assign syllable nodes (σ) to be in one-to-one correspondence with [+syllabic] sounds.”
- e.g. *Utah*

σ σ

| |

/juta/ → ju ta

Onset Formation

- “we can often predict the syllabification of intervocalic clusters by observing *the set of consonant clusters that may begin a word*: VC_1C_2V will be syllabified $[V]_\sigma[C_1C_2V]_\sigma$ if a word can begin C_1C_2V…”
- “Join consonants to the following syllable, provided the resulting cluster can occur at the beginning of a word (Maximal Onset Principle).” (Hayes)

Onset Formation

- σ σ → σ σ
  | | → / | / |
  /juta/ → ju ta → j u t a
  (Syll assign.) (Onset form.)
- *atrocious* vs. *Atlantic* (<Kenstowicz)
  - [ə.tro.ʃəs]
    - cf. *Troy*
    - more narrowly, [ə.tʰro.ʃəs]
  - [æt.læn.tɪk]
    - $*_{Wd}$[tl
    - more narrowly, [æt^{ʔ}.læn.tɪk]

Spanish vs. Ilokano onsets

- Spanish [kwa.tɾo] ‘4’ (obeys Maximal Onset Principle)
  - cf. [tɾes] ‘3’
- but Ilokano [kwat.ɾo] ‘4’ (< Spanish)
  - contains “the preglottalized [ˀt] allophone that we generally find in syllable-final position” (Hayes)
  - “vowels are typically shorter when they are followed by a consonant in their syllable” (Maddieson 85, Closed Syllable Shortening) and “the Ilokano [a] vowel is noticeably shorter than the Spanish.”
- also “native speakers of both languages intuit these syllabifications”
  - (probably, where pause possible)

Language-specific

- Many languages have
  - Coda formation
    - Hayes: “Join any consonants not yet syllabified to the preceding syllable.”
- /ætlæntɪk/ → ætlæntɪk → æt læn tɪk → æt læntɪk

|	|	|	|	|	|	|/	|/	|/
σ	σ	σ	σ	σ	σ	σ	σ	σ
Syll Assign.			Onset Form.			Coda Form.		

Syllable typology

- “The only ‘universal syllable,’ present in every language, … is CV.” Hayes (p. 257)
- “In many languages (e.g. Arabic, Ilokano), every syllable must begin with an onset”
  - “onsets are never forbidden”
- “In many languages (e.g. Samoan, Zulu), codas are forbidden.”
  - “there are apparently no languages that require every syllable to have a coda.”

Typology of syllables and languages

- < Clements and Keyser 1983

		Onset	
		required	not required
Codas	banned	CV (Senufo)	CV, V (Maori)
	allowed	CV, CVC (Klamath)	CV, V, CVC, VC (English)

Language outliers

- Gilbertese (Micronesian)
  - tautosyllabic VVVV
    - -kaaei (augmentative suffix)
- Georgian
  - tautosyllabic CCCCCC
    - [mc’vrtneli] ‘trainer’
    - [gvprckvnis] ‘he peels us’

Practice: English /ʌl/, data pp. 267-26

1 *English /ʌl/ coalescence*

In some English dialects the sequence /ʌl/ is optionally realized as syllabic [l̩] in certain environments. Here are relevant data.

dull	['dʌl] or ['dl̩]
null	['nʌl] or ['nl̩]
hull	['hʌl] or ['hl̩]
color	['kʌlɚ] only
Cullen	['kʌlən] only
Tuller	['tʌlɚ] only
Culver	['kʌlvɚ] or ['kl̩vɚ]
Mulholland	[mʌl'hɑlənd] or [ml̩'hɑlənd]
bulky	['bʌlki] or ['bl̩ki]

a. Apply the rules given in the readings to syllabify all the underlying forms above.
b. State a rule for /ʌl/ → [l̩]. To write a rule that is undergone by two segments, merging them into one, use the numerical subscripts shown in fn. 9, p. 101, and let one of the sounds become zero.
c. Give derivations, including the initial syllabification stage, of *dull*, *Culver*, and *color*.

[9] Here is how to do the concept "changes places with." Put a number underneath each segment in the rule. Then, on the right side of the arrow, list everything in the input, using the numbers to show what has changed places. So, for instance, this rule:

V	t	p	V	→	V	p	t	V
1	2	3	4		1	3	2	4

means "reverse the order of /tp/ when surrounded by vowels."

"Apply the rules given in the readings to syllabify all the underlying forms above."

- What are the underlying forms?
- Syllabic sonorants in complementary distribution with [ʌ] (and [ə])
  - Compare distribution, [ʌC] vs. [C̩], in monosylls
  - S. Hargus idiolect
  - [C̩] only in *burr, bull*
  - [ʌ] has wide distribution: *up*, *rub*, *but*, *bud*, *buck*, *bug*, *buff*, *love*, *doth*, *bus*, *buzz*, *lush*, *bun*, *bum*, *lung*
  - [C̩] as /ʌC/

“syllabify all the URs”

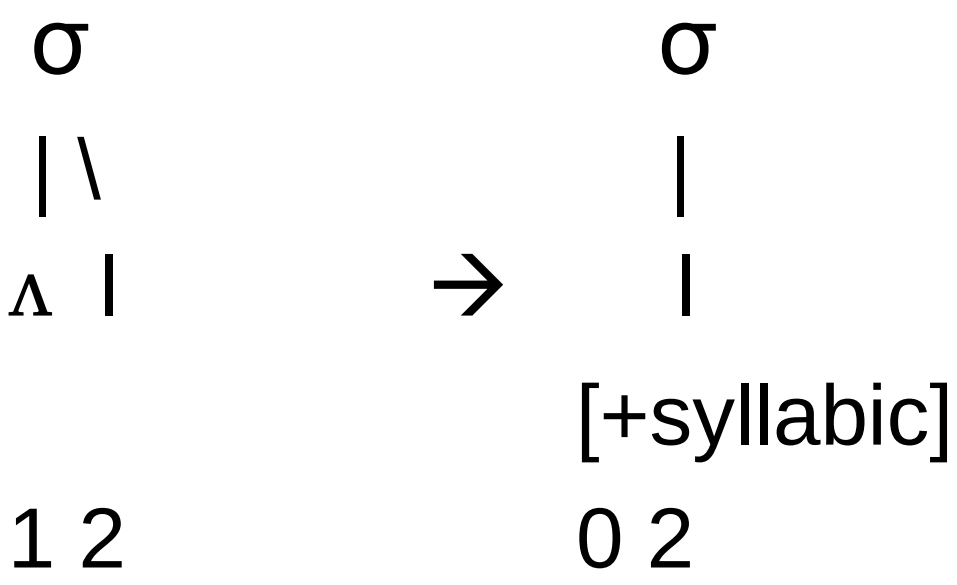
- [.dʌl.] [.nʌl.] [.hʌl.]
- [kʌ.lʌɹ] [kʌ.lʌn] [tʌ.lʌɹ]
- [kʌl.vʌɹ] [mʌl.hɑ.lʌnd] [bʌl.ki]

“state a rule for /ʌl/ → [l]”

- “To write a rule that is undergone by two segments, use the numerical subscripts shown in fn. 9, p. 101, and let one of the sounds become zero.”

“state a rule for /ʌl/ → [l]”

- L Vocalization (optional)



- UR /dʌl/
- σ assignment

  dʌl

  |

  σ
- Onset formation

  dʌl

  \ |

  σ
- Coda formation

  dʌ l

  \ |/

  σ
- L-Vocalization (optional)

  d l

  \ /

  σ
- PR

  dʌl d l

  \ |/ \ /

  σ σ

- UR /kʌlvʌɹ/
- σ assignment

  kʌlvʌɹ
  | |
  σ σ
- Onset formation

  kʌlvʌɹ
  \| \|
  σ σ
- Coda formation

  kʌlvʌɹ
  \|/ \|/
  σ σ
- L-Vocalization (optional)

  k lvʌɹ
  \ / \|/
  σ σ
- R-Vocalization

  kʌl v ɹ k l v ɹ
  \|/ \ / \ / \ /
  σ σ σ σ

- UR /kʌlʌɹ/
- σ assignment
  kʌlʌɹ
  | |
  σ σ
- Onset formation
  kʌ lʌɹ
  \| \|
  σ σ
- Coda formation
  kʌ lʌɹ
  \| \|/
  σ σ
- L-Vocalization (optional) -- (structural description not met)
- R-Vocalization
  k ʌ l ɹ
  \ | \ /
  σ σ

Summary

- Syllabification is predictable
- Partly universal
  - VCV → V.CV
- Partly language-specific
  - VCCV → VC.CV or V.CCV
  - Considerations
    - word-initial clusters
    - C allophones diagnostic of syllable position

Stress and Syllable Structure in English:
Approaches to Phonological Variations[*]

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Abstract

1. What is phonological variation?

We use phonological variation to refer to alternative forms that can be used for more or less similar purposes. For example, in English a word made of CVCVCV can have stress on the first syllable, as in *Canada*, or on the second syllable, as in *banana*. There is no reason why the stress pattern could not have been the other way round, i.e. for *Canada* to have stress on the second syllable and for *banana* to have stress on the first. Nor is there any reason why stress in such words cannot be all on the first syllable, or all on the second. English just happens to use both forms. Similarly, an English word can be VC, such as *Ann*, CVC, such as *sit*, or CCCVC, such as *split*. There is no reason why a word must use one or another form and English just happens to use all those forms.

Besides variations within a language, there are also variations across different languages. For example, before the nuclear vowel Standard Chinese allows CG- but not CC-, whereas English allows both CG- and CC-. Similarly, Standard Chinese only allows [–n] and [–ŋ] after the nuclear vowel, whereas English allows many more consonants.

[*] Portions of this work were presented at University of Michigan in 2002, the Second North American Phonology Conference in 2002, Wayne State University in 2004, Peking University in 2004, the 10th Mid-Continental Workshop on Phonology in 2004, and National Chengchi University, Taipei, in 2005. We thank the audiences for their comments.

Moreover, Standard Chinese uses five underlying vowels (Duanmu 2000, not including diphthongs), whereas English uses about ten.

Indeed, linguistic variations go beyond phonology and extend to other areas, such as syntax, semantics, and the lexicon. For example, Japanese uses the word order SOV, whereas English and Chinese use SVO. Similarly, the galaxy we are in is called *the Milky Way* in English but *Yin He* 'Silver River' in Chinese, and the animal 'cat' is called [kæt] in English but [mau] in Chinese. For learning the content of a book and that of a movie, English uses two different verbs—*read* for the former and *see* for the latter, whereas Chinese use the same verb *kan* for both activities.

Obviously, what distinguishes one language (or dialect) from another is the set of choices a language makes with regard to various linguistic variations. Therefore, linguistic variations are what descriptive linguists are primarily interested in.

2. Approaches to phonological variations

For describing a language, it is perhaps enough to list the choices the language makes with regard to various aspects of linguistic variations, such as the lexicon, the word order, the consonant and vowel inventories, syllable structures, stress patterns, and so on, assuming that we already know what kind of linguistic variations there are.

For theoretical linguists, additional questions can be raised. For example, for a given aspect of variation, such as syllable structure, is the number of possible forms limited? And if it is, how many forms and what kind of forms are there? Specifically, does every syllable require a vowel? If in some languages every syllable requires a vowel, how many consonants can occur before the vowel in a syllable? For example, we know

that English allows three consonants before the vowel, as in the word *split*. Is it possible for a language to allow four consonants, or seven consonants, before the vowel? Such questions are far from obvious.

In this article we focus on two well-known phonological variations—syllable structure and word stress, and discuss four approaches to them. For lack of space, we will focus on American English only (hereafter English), although the argument applies to variations across different languages, too. The main question for all the approaches is, is there any generalization to be made of the many patterns that are found in English syllable structure or word stress? The four approaches are given in (1).

(1) Approaches to phonological variations

a. *The no-pattern approach*: There is no useful generalization to be made of the patterns

b. *The norm-and-exceptions approach*: One of the patterns is the norm for the given language; others are exceptions of various sorts.

c. *The loose-requirements approach*: All the patterns are good and conform to some loosely defined structure.

d. *The inviolable-constraints approach*: There is a set of inviolable constraints that all patterns must satisfy. Alternative patterns are possible because the constraints can be satisfied in more than one way.

The first three approaches have been proposed before. The last is new and is what we will argue for. In what follows we illustrate the approaches with quantitative data from the entire English lexicon.

3. English word stress

Most analyses, such as Halle and Vergnaud (1987) and Hayes (1995), assume that English words are first syllabified, and then word stress is assigned according to the syllable patterns. For syllabification, most analyses follow Kahn (1976) and assume the Maximal Onset rule, according to which intervocalic consonants are syllabified as the onset of the following vowel as far as is allowed by the given language. Some examples are shown in (2), where syllable boundaries are indicated by a dot.

(2) Syllabification according to Max Onset

Canada	[kæ.nə.də]
banana	[bə.næ.nə]
pedigree	[pɛ.dɪ.gri]
committee	[kə.mɪ.ti]
essay	[ɛ.se]
alpine	[æl.pain]

Stress assignment is sensitive to the weight of a syllable, i.e. whether a syllable is heavy or light, as defined in (3), where VV is a diphthong or a tense vowel.

(3) Heavy syllable: the rhyme is VX (VV or VC)

Light syllable: the rhyme is V (a short vowel) or C (a syllabic C)

The weight patterns of the words in (2) are shown in (4), where L is a light syllable and H is a heavy one.

(4)

Words	Syllables	Weight
Canada	[kæ.nə.də]	LLL
banana	[bə.næ.nə]	LLL
pedigree	[pɛ.dɪ.gri]	LLH
committee	[kə.mɪ.ti]	LLH
essay	[ɛ.se]	LH
alpine	[æl.pain]	HH

It is worth noting that the syllabification just discussed differs from what we will argue for. We will return to this later.

Having discussed syllable structure, let us consider stress assignment. According to standard descriptions (e.g. Halle and Vergnaud 1987 and Hayes 1995), main stress in English words follow the rules in (5), although each rule have some exceptions. For ease of reading the syllable with main stress is underlined in the weight representation.

(5) English word stress: standard description

a. Stress the final syllable if it has a long vowel

Examples:	*Tennessee*	LL**H**
	decay	L**H**
	sardine	H**H**
Exceptions:	*pedigree*	**L**LH
	committee	L**L**H
	essay	**L**H
	alpine	**H**H

b. Else stress the penultimate syllable if it is heavy

Examples:	*agenda*	L**H**L
	Maria	L**H**L
Exceptions:	*carpenter*	**H**HL
	Julia	**H**HL

c. Else stress the antepenultimate syllable

Examples:	*America*	L**L**LL
	Canada	**L**LL
Exceptions:	*Alabama*	LL**L**L
	banana	L**L**L

It would be interesting to know to what extent the standard description is true for the entire English lexicon. Alcantara (1998) offers some data, based on the CELEX lexical corpus (Baayen et al 1993), which contains some 52,000 English 'lemmas', which are basically uninflected words. The result for words that have three or more syllables is shown in (6).

(6) Stress distribution in CELEX for words of SSS+

	Nouns			Verbs			Adjectives		
	σσσ	σσσ	σσσ	Σσσ	σσσ	σσσ	σσσ	σσσ	σσσ
HHH	33	54	11	4	11	84	34	35	30
LHH	36	53	9	58	17	25	47	52	0
HLH	77	3	17	24	6	69	56	3	40
LLH	72	7	18	62	2	34	71	8	19
HHL	35	62	1	3	91	5	3	97	0
LHL	23	73	2	6	85	8	31	67	0
HLL	74	15	8	12	60	27	51	42	6
LLL	78	15	5	36	45	18	82	17	0

In (6), only the last three syllables are shown, since it is where main stress usually falls. The first column shows the weights of the syllables, where H is a heavy syllable and L is a light syllable. The syllabification is based on the Max Onset rule (Kahn 1976). Since a final CVC syllable does not always attract stress, the final syllable is coded as H only if it has a long vowel, otherwise it is coded as L. A long vowel refers to a diphthong, a tense vowel, and a stressed [r] (as in *fur* or *bird*), but not an unstressed [r] (as in the second

syllable of *worker*). The number in each cell shows the percentage of words with that stress pattern. For example, in HHH for nouns, 33% of the words have main stress on the third last syllable, 54% of the words have main stress on the second last syllable, and 11% of the words have main stress on the final syllable. The three percentages for each weight pattern do not always add up to 100%, probably because in some words main stress is not on the last three syllables.

Duanmu and Stiennon (2004) offer a similar study with the CMUDICT lexicon (Weide 1998), which has some 127,000 words, including inflected words. The result is shown in (7). In the top row, '1' indicates main stress, '2' indicates secondary stress, '0' indicates no stress, and 'X' indicates any stress. The number in other cells shows the number of words for the given weight and stress pattern. The shaded cells show the stress patterns predicted by the standard description of English word stress in (5), and the last column shows the percentages of the shaded cells for each weight structure.

(7) Stress distribution in CMUDICT for words of SSS+

	100	102	120	122	X10	X12	XX1	Other	%
HHH	736	423	33	15	2921	83	277	67	6
HHL	2345	198	922	4	3577	16	91	400	47
HHS	310	104	43	1	605	16	47	24	53
HLH	1544	1468	118	4	746	16	286	231	7
HLL	3501	273	342	3	1420	1	100	247	60
HLS	743	216	24	0	287	0	110	44	52
LHH	443	374	5	14	2113	107	135	263	4
LHL	1592	149	95	3	4040	37	37	1466	55

LHS	247	73	3	2	787	9	26	45	66
LLH	1617	1270	4	1	555	17	167	536	4
LLL	2941	232	37	0	1427	6	68	601	55
LLS	702	130	0	0	346	0	57	100	53
Total	16721	4910	1626	47	18824	308	1401	4024	37

It is not obvious from the corpus data what the generalization for English word stress should be. In what follows we discuss four proposals.

3.1.The no-pattern approach

In this approach, there is no attempt to find a general pattern that applies to all or most words, probably because no generalization is believed to exist. For example, Daniel Jones (1972: 248) states that 'Generally speaking there are no rules determining which syllable or syllables of polysyllabic English words bear the stress.' As a result, stress patterns are simply listed in the lexicon. Any apparent trends or statistical preferences for certain patterns are probably due to historical accidents.

3.2.The norm-and-exceptions approach

This approach assumes that English has a default stress pattern, similar to what is stated in (5), although there are some exceptions. There are four slightly different versions of this approach, shown in (8).

(8) Four versions of the norm-and-exceptions approach

a. Language typology

b. Language parameters

c. Rule-based theory

d. Optimality Theory

For those who assume language typology, there is perhaps a limited number of types for each linguistic aspect (e.g. stress, syllable, word order, etc.). For example, there is a limited number of types for word stress, such as initial vs. final stress, mora counting vs. syllable counting, and whether stress is sensitive to syllable weight. Each language chooses one type, which is the norm for that language. A language may also contain some exceptions. With regard to English stress, the norm is what is stated in (5), and the presence of exceptions is expected.

Language parameters assume that there is a limited number of parameters for each linguistic feature, such as stress. For example, Halle and Vergnaud (1987) propose a number of stress parameters, such as whether we count syllables or rhyme segments, whether the last syllable is counted or ignored, whether a foot has initial stress or final stress, whether heavy syllables attract stress or not, and so on. Each language chooses one parameter set, which determine the normal stress pattern for that language. A language may also contain a number of other patterns, which are exceptions. Exceptions are lexically marked (memorized), which can violate the parameter setting of the given language.

The rule-based theory assumes that a grammar is a set of rules. Each language can have its own set of stress rules, which determine the normal stress pattern for that language. For example, English has a set of stress rules, and French has a different set of

stress rules. The rules for stress can in fact be quite limited and can be translated into parameters, as shown by Halle and Vergnaud (1987). Patterns that do not fit the rules are exceptions, which are thought to be common in phonology (Bromberger and Halle 1989). Exceptions are lexically marked or memorized. In (9)-(11) we illustrate the rule-based analysis of English word stress, where a trochaic foot is one whose stress is on the left of the foot.

(9) English main stress rules (ordered):

Extrametricality:	Ignore the last syllable unless it contains a long vowel
Stress heavy:	Put stress on heavy syllables
Trochee on right:	Build a trochaic foot from the right side of the word.

(10)

Rules	a.gen.da	car.pen.ter*
Extrametricality	a.gen.<da>	car.pen.<ter>
Stress heavy	a.gén.<da>	*exception**
Trochee on right	a.(gén).<da>	(cár.pen).<ter>

(11)

Rules	A.me.ri.ca	A.la.ba.ma*
Extrametricality	A.me.ri.<ca>	*exception**
Stress heavy	n/a	n/a
Trochee on right	A.(mé.ri).<ca>	A.la.(bá.ma)

The rules correctly assign main stress to *agenda* and *America*. The words *carpenter* and *Alabama* are exceptions, which do not undergo the same rules as other words. In particular, *carpenter* does not undergo the rule 'stress heavy', and *Alabama* does not undergo the rule 'extrametricality'. Without the exceptional provisions, *carpenter* and *Alabama* would have been assigned other stress patterns.

In Optimality Theory (OT, Prince and Smolensky 1993), ordered rules are replaced with ranked constraints. Still, there is a limited number of constraint rankings for stress patterns, and each language chooses one constraint ranking, which determine the normal stress pattern for that language. A language may also contain other stress patterns, which are exceptions. Exceptions are lexically marked, which can override the constraints for normal words. In (12)-(14) we illustrate the analysis in OT. Following Hammond (1999), an exceptional word has a lexically marked stress, and the constraint Lex-Stress requires it to be realized. The constraint ranking shows one possible analysis, although other analyses are also possible.

(12) OT constraints

Lex-Stress (Lex):	Lexical stress must be realized
Trochee (Tro):	Stress is on the left of the foot
Foot-Binarity (FB):	A foot must have two syllables
Non-Finality (NF):	A right-side foot boundary should not be a word boundary
Foot-Right (FR):	Build a trochaic foot from the right end of the word.

Ranking: Lex>>Tro>>FB>>NF>>FR

(13)	/America/	Lex	Tro	FB	NF	FR
	Ame(rica)				*!	
	(Ame)rica					**!
	√ A(meri)ca					*
	Ame(ri)ca			*!		*

(14)	/Alabáma/	Lex	Tro	FB	NF	FR
	√ Ala(báma)				*	
	(Ala)bama	*!				**
	A(laba)ma	*!				*
	Ala(bá)ma			*!		*
	A(labá)ma		*!			*

It is worth noting that one can in principle lexically mark stress for all words, but then most constraints become useless.

There are two general problems for the norm-and-exceptions approach. First, it is not always obvious which pattern should be chosen as the norm. For example, one can choose *banana* and *Alabama* as the norm and *Canada* and *America* as exceptions, or the other way round. In principle either way is possible. One might suggest that we should look at the statistic patterns and choose the most frequent pattern to be the norm. However, as we saw in the corpus data earlier, as far as English word stress is concerned, it is not obvious whether there is always a dominant pattern for a given weight type, or

whether the dominant patterns for different weight types form a coherent group for the language. The second problem for the norm-and-exceptions approach is that it is not clear whether there is any constraint that holds for all words, or for all languages. For example, in the parameter-based analysis, one can choose binary feet or ternary feet, and so neither foot type is universally required. Similarly, in the OT approach, one can rank Foot-Binarity (or any other constraint) high or low, and so it is not required for all words. Indeed, the norm-and-exceptions approach explicitly assumes that exceptions are possible, and so there is in principle not constraint that must hold for all words. This position contrasts sharply with the standard practice in syntax, such as Chomsky (1981), where true constraints (known as 'principles') are inviolable for all languages.

3.3.The loose-requirements approach

Burzio (1994) offers an analysis of English stress in which all words have normal stress patterns, with no exceptions as far as main stress is concerned (there are some problems with secondary stress, which we do not review here; see Kim 2000 for more discussion) . However, the analysis is achieved by assume flexible foot structures. In particular, Burzio assumes two general foot patterns, each including several sub-cases, shown in (15), where H is a heavy syllable, L is a light syllable, σ is either H or L, and Ø is an empty syllable. All feet are trochaic and have initial stress.

(15) Burzio's foot types

(Hσ): (HL), (HH), (HØ)

(σLσ): (HLH), (HLL), (LLH), (LLL)

A crucial assumption in Burzio's analysis is that syllabification is sensitive to stress (or foot structure). In addition, syllabification and stress are not carried out in sequence but are checked simultaneously. Specifically, a CVCV sequence is not always syllabified as CV.CV, but can be CVC.CV if stress is on the first syllable; in this case the medial C is thought to be a geminate, although little evidence is provided. The analysis of some sample words is shown in (16).

(16)	*potato*	L(HL)	σσ́σ
	period	(HH)L	σ́σσ
	Juliet	(HH)(HØ)	σ̀σσ́
	alpine	(HH)	σ̀σ
	sardine	(ØH)(HØ)	σ̀σ́
	city	(HL)	σ́σ
	citizen	(LLL)	σ́σσ

A few comments are in order. First, a light syllable at the end of a word can be left unfooted, as in *period*. Second, a final [i] is treated as a short vowel, as in *city*, following Chomsky and Halle (1968). Third, a heavy syllable need not have stress, such as the second syllable in *alpine*, although most analyses thought that it has secondary stress. Burzio argues that the perceived prominence on such a syllable is not due to stress, but to the fact that the vowel is unreduced. Forth, in *sardine*, Burzio assumes that the first syllable forms an iambic foot with an empty syllable. It is unclear why Burzio does not

think it is simply unfooted, similar to the second syllable in *alpine*. If he does, there is no need to assume iambic feet.

In summary, in Burzio's analysis all English words are regular as far as main stress is concerned. There are no exceptions because all the feet conform to the two general foot types. However, the success is achieved by allowing flexible foot types, and sometimes flexible syllabification. For example, it is unclear what relation there is among the list of allowable feet, such as that between (HL) and (LLH). Burzio argues that all the feet are related because they are similar in some kind of 'total weight', yet the definition of total weight seems to be complicated and the calculation seems to be ad hoc. In addition, some proposed feet are rather unusual cross-linguistically, such as (LLL) and (HLH). For more comments on Burzio's analysis, see Kim (2000).

3.4.The inviolable-constraints approach

The approach we argue for differs from previous ones in a major way. While other analyses assume that all phonological generalizations can in principle have exceptions, we believe that there are truly inviolable phonological constraints that hold for all words. In addition, while most previous analyses are formulated in such as way as to pick out one of the alternative forms as the norm, we believe that it is possible to have multiple forms that all satisfy the same set of inviolable constraints and so are all good.

To see how different forms can all satisfy the same set of constraints, consider a case of foot formation, illustrated in (17) and (18).

(17) Constraints on foot structure:

A foot must be disyllabic.

An empty syllable Ø can occur in final position only.

(18)

Length	Possible and impossible foot structures
σ	(σØ), *(σ), *(Øσ)
σσ	(σσ), σ(σØ), *(Øσ)(σØ), *(Øσ)(σ), *(σØ)(σ) …
σσσ	(σσ)σ, σ(σσ), (σσ)(σØ), *(Øσ)(σσ), *(σØ)(σσ) …

If we assume the constraints in (17), then for each word length, there can be one or more foot structures that are equally good, in the sense that they all satisfy the given constraints, and structures that are bad, in the sense that they violate one or more of the constraints. In addition, there is no need to assume that one of the good forms for a given word length is necessarily better than others.

Now if a given word length can have several good structures, does it mean that all of them can be used for the same word? For example, since σσσ has three good structures, (σσ)σ, σ(σσ), (σσ)(σØ), can we pronounce a word like *Canada* in three different ways? The answer is no, obviously. Each word must choose one of the possible forms upon its creation, and this form is memorized along with the word itself. This is similar to saying that when a word is created, we could choose any vowel(s) and consonant(s) for the given language to represent the pronunciation, but once the choice is made, it is memorized along with the word.

Another possible question is that, when a new word is created, are all the possible forms equally likely to be chosen? The answer is no. We believe that the choice for how to represent a new word does not always depend on phonological factors. Instead, it can be influenced by statistic effect or completely accidental. This is similar to saying that when a new word is created, there is no way to predict, based on phonological theory, which consonants and vowels it will use. All we can say is that the consonants and vowels must be drawn from the sound inventory of the given language. Similarly, the foot structure of the new word must be drawn from one of the good forms for the given word length.

As another example of how different forms can all satisfy the same set of constraints, consider a case of syllabification, illustrated in (19) and (20), where V represents a stressed vowel and v an unstressed one.

(19) Constraint on syllabification:

Stressed syllables must be heavy.

(20)

Word	*civic*	*Japan*	*asset*
Good	CVC.vC	Cv.CVC	CVC.VC
Bad	*CV.CvC	CvC.VC	*CV.CVC

If we assume just the constraint on syllabification in (19), then we predict three possible ways to syllabify CVCVC, including a case where syllabification is ambiguous (for

Japan). Of course, additional constraints can resolve the ambiguity, which we will leave open.

Let us now consider the analysis of main stress in English word. We assume that syllabification and stress are not sequentially ordered, but are inter-dependent and simultaneously checked. We propose the constraints in (21), which are the same as what we have discussed earlier.

(21) Constraints on stress and syllabification:

A foot must be disyllabic.

An empty syllable Ø can occur in final position only.

Stressed syllables must be heavy.

(Heavy syllables must have stress.)

Foot binarity is well-known in phonology and is not further justified here. The empty syllable has also been proposed by many people (e.g. Abercrombie 1967, Liberman 1975, Selkirk 1984, Giegerich 1985, Hogg and McCully 1987, Burzio 1994). Our assumption is more specific in that the empty beat is only available in final positions, where it is phonetically realized as either a pause or the lengthening of the preceding syllable (Klatt 1975, 1976). The relation between syllabification and stress has also been recognized in the literature for a long time (Prokosch 1939, Fudge 1968, Bailey 1978, Selkirk 1982, Blevins 1995, Hammond 1999, and others). The last constraint is what Prince (1990) calls the Weight-to-Stress Principle. We put it in parentheses because there are some apparent counter-examples, to be discussed later.

Let us now consider some examples. First, consider those in (22) and (23). Following previous analyses, we assume that an unstressed [r] is short, as the last syllable in *carpenter*.

(22) Heavy syllables need not have stress:

Japan	L(HØ)	σσ́	CV.CVC.Ø
minister	(HL)L	σ́σσ	CVC.V.CCV
civic	(HH)	σ́σ	CVC.VC
carpenter	(HH)L	σ́σσ	CVC.CVC.CV
potato	L(HH)	σσ́σ	CV.CVV.CVV
period	(HH)H	σ́σσ	CVV.CVV.VC
Juliet	(HH)(HØ)	σ̀σσ́	CVV.CVV.VC.Ø
city	(HH)	σ́σ	CVC.VV
citizen	(HL)H	σ́σσ	CVC.V.CVC

(23) Heavy syllables must have stress:

civic	(HL)	σ́σ	CVC.V.C
carpenter	(HL)L	σ́σσ	CVC.CN.CV
potato	L(HL)	σσ́σ	CV.CVV.CV
period	(HL)L	σ́σσ	CVV.CV.V.C
Juliet	(HL)(HØ)	σ̀σσ́	CVV.CV.VC.Ø
city	(HL)	σ́σ	CVC.V
citizen	(HL)L	σ́σσ	CVC.V.CN

In (22), every tense vowel is treated as long. For example, the second syllable of *city* has a long vowel, which is unstressed, because a heavy syllable does not have to have stress. In addition, final VC is treated as forming a heavy syllable. For example, the second syllable of *civic* is heavy, although it does not have stress, again because a heavy syllable does not have to have stress. If we assume that heavy syllables must have stress, some words must be analyzed differently, as shown in (23), which differs from (22) in three ways. First, a tense vowel, especially [i], can be analyzed as short when it has no stress (Pike 1947, Chomsky and Halle 1968, Hammond 1999). Thus, *city* is (HL) instead of (HH). Second, a final C need not be in the same syllable as the preceding V. For example, in *civic*, the final C is either left unsyllabified or is the onset of an empty vowel (Burzio 1994, Lowenstamm 1996); thus, *civic* is (HL) or (HL)Ø, instead of (HH). Third, the rhyme of the second syllable in *carpenter* is not VC but a syllabic N, so that the syllable is not H but L. The same applies to the third syllable in *citizen*.

We have shown how our analysis works for main stress in some sample words. Let us now consider secondary stress as well. First, we need to take a closer look at foot structure. Unlike the traditional assumption, according to which a language uses either moraic feet or trochaic feet, we believe that English uses both moraic feet and syllabic feet (Duanmu 1999, Kim 2000). Specifically, following the constraint that a foot must be binary and the constraint that a stressed syllable must be heavy, there is one possible moraic foot, shown in (22), and two possible syllabic feet, shown in (24). Since each syllabic foot also contains at least one moraic foot, we call it the ‘dual-trochee’.

(24) Moraic foot (moraic trochee):

σ

/\

(mm)

x

(25) Syllabic foot (the dual-trochee):

x	x	
(σ σ)	(σ σ)	Syllabic foot
/\ /\	/\ |	
(mm).(mm)	(mm).m	Moraic foot
x x	x	
heavy-heavy	heavy-light	
(HH) or σσ	(HL) or σσ	Shorthand

It is worth noting that since (HH) has two moraic feet, both syllables have stress, which is (σσ). Some examples are shown in (26).

(26)

	sardine	H(HØ)	σ̀σ́
	alpine	(HH)	σ́σ̀
	panda	(HL)	σ́σ
	Canada	(HL)L	σ́σσ
	bike	(HØ)	σ́

The analysis distinguishes three degrees of stress: (a) H in the first syllable of a syllabic foot, which has main stress, (b) other Hs, which have secondary stress, and (c) L, which has no stress. We assume that main stress must fall on a syllabic foot. Therefore, a monosyllabic word like *bike* is also a syllabic foot.

Let us now consider how our analysis applies to the entire lexicon. For demonstration, let us consider the CMUDICT corpus. The stress patterns under traditional syllabification are repeated in (27), where in the top row '1' means main stress, '2' means secondary stress, '0' means no stress, and 'X' means any stress.

(27) Stress distribution in CMUDICT for words of SSS+

	100	102	120	122	X10	X12	XX1	Other
HHH	736	423	33	15	2921	83	277	67
HHL	2345	198	922	4	3577	16	91	400
HHS	310	104	43	1	605	16	47	24
HLH	1544	1468	118	4	746	16	286	231
HLL	3501	273	342	3	1420	1	100	247
HLS	743	216	24	0	287	0	110	44
LHH	443	374	5	14	2113	107	135	263

LHL	1592	149	95	3	4040	37	37	1466
LHS	247	73	3	2	787	9	26	45
LLH	1617	1270	4	1	555	17	167	536
LLL	2941	232	37	0	1427	6	68	601
LLS	702	130	0	0	346	0	57	100
Total	16721	4910	1626	47	18824	308	1401	4024

For lack of space, we focus on two of the twelve rows in (27), HHH and LLL. Again we consider two possibilities: (a) heavy syllables must be stressed and (b) they need not be stressed. The stress patterns of HHH are shown in (28) and (29), with one sample word for each case. The last case 'other' mostly includes compounds or suffixed words, where main stress is not on the last three syllables.

(28) Stress patterns for HHH (H need not be stressed)

Stress	Word	Foot	Count
100	*agency*	(HH)H	736
102	*handlebar*	(HH)H	423
120	*somebody*	(HH)H	33
122	*workmanlike*	(HH)H	15
X10	*Armani*	H(HH)	2921
X12	*re-export*	H(HH)	83
XX1	*Vietnam*	HH(HØ)	277
Other	*photocopy*	(HH)(HH)	67

(29) Stress patterns for HHH (H must be stressed)

Stress	Word	Foot	Count
100	*agency*	(HL)L	736
102	*handlebar*	(HL)H	423
120	*somebody*	(HH)L	33
122	*workmanlike*	(HH)H	15
X10	*Armani*	H(HL)	2921
X12	*re-export*	H(HH)	83
XX1	*Vietnam*	LH(HØ)	277
Other	*photocopy*	(HL)(HL)	67

In (28), where H may or may not have stress, the analysis is simple. All cases satisfy foot binarity and the requirement for stressed syllables to be heavy. In (29), every H either has main stress or secondary stress, and unstressed syllables are all L. This requires some assumptions discussed earlier. In particular, unstressed tense vowels need not be long (*agency*, *somebody*, *Armani*, *Vietnam*, and *photocopy*), and some syllables contain a syllabic C without a V (*agency* and *handlebar*).

Next consider the stress patterns of LLL, shown in (30) and (31), with one sample word for each case. It should be pointed out that the syllabification for LLL is based on Max Onset. In the present analysis, such words are not LLL but contain at least one H for the main stress. The stress pattern 122 is not found. The last case ‘other’ mostly includes compounds or suffixed words, where main stress is not on the last three syllables.

(30) Stress patterns for LLL (H need not be stressed)

Stress	Word	Foot	Count
100	*abacus*	(HL)H	2941
102	*amabel*	(HL)H	232
120	*breadwinner*	(HH)L	37
122			0
X10	*banana*	L(HL)	1427
X12	*jimenez*	L(HH)	6
XX1	*minuet*	HH(HØ)	68
Other	*considerable*	H(HL)LH	601

(31) Stress patterns for LLL (H must be stressed)

Stress	Word	Foot	Count
100	*abacus*	(HL)L	2941
102	*amabel*	(HL)H	232
120	*breadwinner*	(HH)L	37
122			0
X10	*banana*	L(HL)	1427
X12	*jimenez*	L(HH)	6
XX1	*minuet*	(HL)(HØ)	68
Other	*considerable*	L(HL)LL	601

Little comment is needed for (30), where H may or may not have stress. All cases satisfy foot binarity and the requirement for stressed syllables to be heavy. In (31), every H either has main stress or secondary stress, and unstressed syllables are all L. This requires treating unstressed tense vowels as short (*minuet*), treating some syllables as having a syllabic C without a V (*considerable*), and treating the final C after an unstressed V as extra-syllabic (*abacus*).

In summary, in the present analysis, all words satisfy the constraint for foot binarity and that for a stressed syllable to be heavy. In addition, there seems to be a third constraint, too, which requires stressed syllables to be heavy and unstressed syllables to be light. We will return to this third constraint shortly.

3.5.Frequency effect

In the present analysis, all good foot structures are treated the same. However, as can be seen in the data, some structures occur more frequently than others. This fact is not reflected in the present analysis, nor is it properly reflected in previous analyses either.

It seems to us that the choice among the good structures is not always determined by phonological factors, but can be influenced by morphology, statistics, or perhaps arbitrary decisions. For example, certain suffixes (or suffix-like strings) require a fixed stress pattern, such as *–átion*,*–átic*, and *-ínski*. Similarly, when a new word is created, its stress pattern can be influenced by those of existing words that look similar. For example, if one does not know the stress for *Renado*, one might try to pronounce it as σσσ, similar to *Leonado*. Finally, consider a case of arbitrary decision. The name *Nadel* once came up

at a meeting of a group of linguists at the University of Michigan, and none know its established pronunciation. As a result, both σσ and σσ were used.

It is possible that a new word can look similar to different existing words in different ways. It is also possible that in this case, the stress pattern is more likely to be modeled after the form that has most existing words. If this is the case, we might expect the lexicon to be heavily skewed towards one or a few stress patterns. The reason is as follows. Suppose for CVCVCV the lexicon originally contains three stress patterns σσ, σσ, and σσ, at more or less the same frequencies. When a new word is created, any of the three patterns is just as likely. But if for some reason one of the patterns begins to have a slightly higher frequency, then new words would be more likely to be modeled after it, and very soon this pattern would dominate the lexicon.

The above discussion intends to show that many factors can influence the frequency differences among alternative foot structures. It is too simplistic to assume that frequency is entirely determined by phonology and that more frequent patterns are phonologically better than less frequent ones.

3.6.Unstressed heavy syllables

We have suggested that there might be a constraint for all heavy syllables to be stressed. There are, however, two sets of apparent exceptions. The first involves unstressed diphthongs [ai], [au], and [oi] in the CMUDICT corpus. Consider the examples in (31), where [ai], [au], and [oi] are sometimes marked as ‘0’ or unstressed.

(32) Unstressed diphthongs in CMUDICT

Word	CMUDICT stress
bilateral	0100
anti-war	201
out-numbered	010
out-numbers	210
Dumfounded	100
Rosenow	100
Eisenhauer	1000
Eisenhower	1020
invoice	10
appointee	001

Syllables with those diphthongs are always analyzed as being heavy. In addition, most phonologists would treat such diphthongs as having secondary stress (e.g. Chomsky and Halle 1968, Halle and Vergnaud 1987, Hayes 1995, Hammond 1999). The discrepancy between the phonological practice and the CMUDICT transcription probably reflects different conventions they follow. In addition, there seems to be some inconsistencies in CMUDICT, too. For example, the syllable [au] has stress in *out-numbers* but no stress in *out-numbered*. Similarly, the syllable [au] has stress in *Eisenhower* but no stress in *Eisenhauer*. Such differences do not seem to reflect phonological reality but inconsistencies by the transcriber or among different transcribers.

A second case of unstressed heavy syllables involve VC rhymes. Some examples are shown in (33), where unstressed VC rhymes are underlined.

(33) Unstressed VC rhymes

*Mac*Donald	σ́σσ
*ex*change	σσ́
*anec*dote	σ́σσ̀

In all analyses, such rhymes are VC (not a syllabic C) and unstressed. And because VC is a heavy rhyme, such syllables seem to violate the requirement for heavy syllables to be stressed. A possible solution is proposed by Pierrehumbert (1994). She argues that consonants at the end of a morpheme need not be syllabified with the preceding vowel. In addition, words like *MacDonald* and *exchange* have an internal morpheme boundary *Mac-Donald* and *ex-change*, even though it might not be semantically obvious to the speaker. Similarly, *anecdote* can be analyzed as *anec-dote*, parallel to *anti-dote*. Following this proposal, the words in (33) can be analyzed in (34), where unsyllabified consonants are in parentheses.

(34)

Mac-Donald	[mə.(k)-dɑn.l.(d)]	L(HL)
ex-change	[ɪ(ks)-tʃen.(dʒ)]	L(HØ)
anec-dote	[æn.ɪ(k)-do.(t)]	(HL)H

In *MacDonald*, [k] and [d] are at the end of a morpheme and need not be syllabified, and [l] is a syllabic C. In *exchange*, [ks] and [dʒ] are at the end of a morpheme and need not be syllabified. In *anecdote*, [k] and [t] are at the end of a morpheme and need not be syllabified. Thus, all unstressed syllables are light. We shall have more to say about syllabification in the next section.

4. English syllable structure

It is often assumed that the beginning of a syllable is similar to the beginning or a word, and the ending of a syllable is similar to the ending of a word. If so, a syllable in English can contain up to three consonants at the beginning, as in *strike*, and up to four consonants at the end, as in *texts*. If so, the maximal English syllable can be CCCVVCCCC, such as *stryexts*, [straiksts], a word that does not exist but probably does not sound too bad. English also allows a range of other syllables smaller than the maximal one.

There is another interesting fact for all analyses to consider, which is reported by Borowsky (1989). Based on an examination of the English lexicon, she found that there is a limit to rhymes that are not morpheme final. The limit is VX, which is either VV (a long vowel or a diphthong) or VC (a short vowel and a consonant). In other words, the non-final rhyme VX is much smaller than the commonly assumed maximal VVCCCC. Borowsky also found a list of exceptions to the VX limit. Let us now consider the same four approaches to the problem.

4.1. The no-pattern approach

In this approach one does not assume any general pattern that English syllables follow. One might not even assume syllable boundaries explicitly. For example, Jones (1950: 130-131) defines the syllable in terms of prominence peaks while leaving it open where the boundary should be between peaks. A more recent version of this approach is that there is no syllabification per se; instead, speakers infer where syllable boundaries should be word medially based on word-edge patterns (Steriade 1999, Blevins 2003), and if word edges offer conflicting patterns, speakers are unsure where syllable boundaries are. The criticism for this approach is that it leaves some important generalizations unaccounted for, such as the limit of VX on medial rhymes.

4.2.The norm-and-exceptions approach

Many phonologists seem to assume this approach. Usually, some kind of maximal syllable size is chosen, and a list of exceptions is noted. The maximal size is usually much smaller than CCCVVCCCC, because no real CCCCVVCCCC is used in English, nor are most initial CCC- or final –CCCC clusters found.

Selkirk (1982) proposes that the maximal English syllable is CCVVCC, as in the word *flounce*. With certain conditions on the CC and VV sequences (such as the sonority sequencing requirement of Selkirk 1984), smaller structures are automatically allowed. Blevins (1995) proposes that the maximal English syllable is CCVVC instead, as in *dream*. As in Selkirk (1982), smaller structures are also allowed.

There are four problems with such an approach. First, it is not obvious whether there is a principled way to determine the maximal syllable structure. One might suggest that perhaps we should look at the frequency data in the entire lexicon, but that does not

seem to be what Selkirk and Blevins did. Second, both Selkirk (1982) and Blevins (1995) miss the fact that non-final rhymes are VX only, as reported by Borowsky (1989). Third, this approach has little to say about possible syllable structures in other languages. For example, can any language allow four consonants before the main vowel? Finally, this approach has little to say about whether there are inviolable constraints that hold for all syllables.

4.3.The loose-requirements approach

The proposal of Fudge (1968) may be an example of this approach. According to him, the English syllable has the structure in (35).

(35) [[[O1 O2] [P3 [C4 C5]]] T6]

O = Onset

P = Peak

C = Coda

T = Terminal

O1, C5, T6 can be [s]+C

Because O1 and T6 can each be [s]+C, and because P can be a diphthong, the structure includes CCCVVCCCC. One challenge for this approach is to exclude syllables that fit the structure but do not occur. Fudge offers a list of ‘collocational restrictions’. For example, if O2 is N, then O1 must be [s], and O1O2 cannot be [tl- dl- …]. Still, one must balance the length of the list of restrictions and the number of exceptions.

Fudge's proposal cannot explain the VX limit on medial rhymes, a fact discovered twenty years later by Borowsky (1989). In addition, there is no explanation why the maximal structure is as such, or why there are those additional restrictions. Finally, there is no discussion of what constraints there are for all syllables.

4.4.The inviolable-constraints approach

In our analysis, the English syllable structure is a lot simpler than previously thought, and there are constraints that hold for all words. In particular, we propose that the rhyme is VX for a heavy syllable and V for a light syllable, where V can be a syllabic C. In addition, the onset is simply C and is optional. In other words, the maximal syllable is CVX. Several other assumptions are also needed, listed in (36).

(36) Assumptions for the English syllable:

a. An initial [s] can be added

b. The onset C can be a complex sound

c. A morpheme-final C can be added

d. Suffix-like Cs can be tolerated at the end of a morpheme

The presence of the initial [s] remains unexplained in our proposal, as it does in other proposals. Therefore, we have little to add here. The statement in (36b) follows the proposal of Duanmu (2002) that a consonant-approximant clusters, such as [pl, pr, kw, …], are in fact a complex sounds [p^{l}, p^{r}, k^{w}, …]. The reason is that only those CR clusters that are allowed by feature theory are found, and those CR clusters that are not

allowed by feature theory are absent. The statement in (36c) has been proposed before (e.g. Lowenstamm 1996, Burzio 1994, Goad and Brannen 2003). The idea is that a final C, such as [k] in *desk*, can serve as the onset of an empty vowel. Another way to look at the presence of the final C is that it can connect with a V-initial suffix, such as *-y* , *-ing*, and *-ize*. Moreover, perhaps owing to the need to keep the shape of a morpheme consistent, the final C can be kept even when the morpheme is not final or nor before a vowel, such as [k] in *desk-less*. The statement in (36d) explains why extra C's at the end of a word are limited to [s, z, t, d, ɵ], all of which can be suffixes. In (37) we offer the analysis of a few sample words.

(37)

text	[tɛk.st]	[-st] are suffix-like
pride	[p^{r}ai.d]	[-d] is suffix-like
grasp	[g^{r}æs.p]	[-p] is final
spike	[s.pai.k]	[-k] is final
spikes	[s.pai.ks]	[-k] is final and [-s] is suffix

Let us now consider to what extent is the present proposal true for the entire English lexicon. For this purpose we examined the 52,447 words in the CELEX corpus (Baayan et al 1993). CELEX offers a number of 'fields' for each word, some of which are shown in (38) for the word *abandon*. CELEX uses its own symbols for phonetic transcription, which need not concern us.

(38)

Field	Content
Word	*abandon*
Phonetic	@-'b{n-d@n
Syllable	[V][CVC][CVC]
Phonetic-syllable	[@][b&n][d@n]

The fields provide an easy way for us to process the lexicon. Some steps are shown in (39), along with their results.

(39)

Step	Result
Start	52,447
Remove compounds	42,089
Extract VXX+	4,193
Remove affixed words	166

We started with 52,447 words. Then we removing compounds (based on the hyphen), because each word of a compound also appears individually. Next we extracted words that contain a non-final rhyme that is VXX (i.e. VVC or VCC) or longer, based on the 'syllable' field. This gives us 4,193 words. Then we removed all words that contain affixes in order to isolate true medial VXX rhymes. This gives us 166 words.

It is quite impressive to have just 166 exceptions (0.3%), out of a lexicon of 52,447. It confirms Borowsky's (1989) finding that nonfinal rhymes are limited to VX. Borowsky also found some exceptions and simply listed them. In addition, she proposes

that extra C's in word-final positions will join the preceding syllable at a later level. For example, a word like *text* would start out as [tɛk.(st)], where [st] are unsyllabified, but will end up as [tɛkst], where all the sounds are in the same syllable.

We believe that the VX restriction is stronger than Borowsky thought. Therefore, it is necessary to take a close look at the exceptions and see if they are real. In addition, there is no need to assume that the VX restriction is relaxed at a later level. First, consider the list of 166 exceptions. There are three cases where the word is a compound or contains an affix, exemplified in (40).

(40) Compounds (without hyphen)

fowlpest, WHO, weltanschauung, feldspar, portfolio, portmanteau

Prefix *ex-*

exchange, exchange, excogitate, excoriate, exhume, expatriate, expatriate, expropriate, extravagance

Suffix *-y*

schmaltz-y

There three other cases where VXX rhymes can be analyzed as VX rhymes, exemplified in (41).

(41) VXC][CV → VX][CCV

surplus [sr:p][ləs] → [sr:][pləs]

scherzo [skɛrt][so] → [skɛr][tso]

VNC] → Ṽ C]

sympton [sɪmp][təm] → [sĩp][təm]

VVC] → VC] (for tense vowels)

aesthetic [i:s][ɵɛ][tɪk] → [is][ɵɛ][tɪk]

almost [ɔ:l][most] → [ɔl][most]

After excluding the cases in (40) and (41), we are left with just three words that have a VXX rhyme, shown in (42).

(42) *ordnance*

arctic

seismic

The words *arctic* and *seismic* probably have a perceived morpheme boundary *arc-tic* and *seis-mic*. We have little to say for *ordnance*. We suspect that it is either perceived as made of two morphemes *ord-nance*, or pronounced as three syllables *or-dn-ance*, but we do not have clear evidence at this point.

In summary, other than the three questionable words in (42), there does not seem to be any word that contains a nonfinal syllable that is larger than CVX.

4.5.Morpheme-final consonants

Both Borowsky (1989) and Pierrehumbert (1994) have observed the lack of morpheme-medial consonant clusters. Therefore, they propose that the English syllable normally allows just one coda consonant so that word-final consonants are not part of the normal syllable structure. Still, both Borowsky and Pierrehumbert assume that the extra consonants ultimately will join the preceding syllable (albeit as 'appendices' for Pierrehumbert).

Unsyllabified consonants in English are often either deleted, such as the initial [p] in *Ptolemy* and [k] in *knight*, or given an extra vowel to form a separate syllable, such as the first C in *Tbilisi* [təb…] and *Nkomo* [əŋk…]. This has lead to the belief that every sound, if it is pronounced, must belong to a syllable (Ito 1986). The belief may be the reason why both Borowsky and Pierrehumbert assume that morpheme-final consonants will ultimately join the preceding syllable. However, if the syllable can accommodate more sounds anyway, why can't it do so medially? Ito (1986) suggests that word-final consonants need not be subject to deletion, even if they are not syllabified, but the reason why the word-edge can offer special exemption remains unclear.

In our view, there are two different reasons for keeping a morpheme-final C. First, consonant suffixes, such as [s] and [t] can be kept, even if they can be syllabified, such as *risk-s* and *risk-ed*. Their ability to stay, in our view, is justified by the fact that they are suffixes (or suffix-like), instead of being syllabified. Second, a morpheme-final C can

form a syllable with a V-initial suffix or stem. For example, the final C in *ex-* [ɪgz] (if *ex-* is a prefix) can serve as the onset of the following vowel in *exact*, *example*, *exasperate*, etc., and the final C in *risk* can serve as the onset of the following vowel in *risky* and *risking*. When a morpheme-final C is not followed by V, such as [k] in *dark-ness*, it can still stay, not because it is now syllabified with the preceding syllable, but because English tends to avoid changing the shape of the morpheme (the 'anti-allomorph' effect). When an extra C is not suffix-like and has no chance of being syllabified (i.e. not at the edge of a morpheme), we predict that it will be deleted, as other analyses do.

5. Conclusions

We have reviewed the variations in English word stress and syllable structure and discussed several approaches to the data. Despite the variations, there seem to be a set of inviolable constraints that all words satisfy, which we summarize in (43).

(43) Constraints on stress and syllabification:

A foot must be disyllabic.

Stressed syllables must be heavy.

Heavy syllables must have stress.

The maximal syllable is CVX.

If our proposal is on the right track, there are some important implications. First, the idea that there are inviolable constraints in phonology raises questions for the most fundamental assumption of Optimality Theory, namely, all constraints can in principle be

violated. Our proposal argues for an approach to phonology that is similar to the standard approach to syntax, which focuses on universal constraints.

Second, our approach suggests a new way of looking at linguistic variation. Instead of assuming that one of the variants is better or more grammatical than others (an assumption that is quite common in phonology), we believe that there can be multiple well-formed structures in the sense that they all satisfy the same linguistic constraints. A language can choose one or more of these structures, and it is necessary to describe which choices a given language makes. It is equally important, if not more so, to consider the constraints themselves so as to understand the range of possible variations in human languages.

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Intonation

Francis Nolan

1 Introduction

The term intonation refers to a means for conveying information in speech which is independent of the words and their sounds. Central to intonation is the modulation of pitch, and intonation is often thought of as the use of pitch over the domain of the utterance. However, the patterning of pitch in speech is so closely bound to patterns of timing and loudness, and sometimes voice quality, that we cannot consider pitch in isolation from these other dimensions. The interaction of intonation and stress — the patterns of relative prominence which characterise an utterance — is particularly close in many languages, including English. For those who prefer to reserve 'intonation' for pitch effects in speech, the word 'prosody' is convenient as a more general term to include patterns of pitch, timing, loudness, and (sometimes) voice quality. In this Chapter, however, intonation will be used to refer to the collaboration of all these dimensions, and, where necessary, the term 'melody' will be used to refer specifically to the pitch-based component.

Intonation is used to carry a variety of different kinds of information. It signals grammatical structure, though not in a one-to-one way; whilst the end of a complete intonation pattern will normally coincide with the end of a grammatical structure such as a sentence or clause, even quite major grammatical boundaries may lack intonational marking, particularly if the speech is fast. Intonation can reflect the information structure of an utterance, highlighting constituents of importance. Intonation can indicate discourse function; for instance most people are aware that saying 'This is the Leeds train' with one intonation

constitutes a statement, but, with another, a question. Intonation can be used by a speaker to convey an attitude such as friendliness, enthusiasm, or hostility; and listeners can use intonation-related phenomena in the voice to make inferences about a speaker's state, including excitement, depression, and tiredness. Intonation can also, for instance, help to regulate turn-taking in conversation, since there are intonational mechanisms speakers can use to indicate that they have had their say, or, conversely, that they are in full flow and don't want to be interrupted.

Intonation is not the only linguistic device for which pitch is recruited by languages; many languages use pitch to distinguish words. In languages around the world as diverse as Thai, Hausa (Nigeria), and Mixtec (Mexico), words are distinguished not only by vowels and consonants but also by the use of one of a limited set of distinctive pitch patterns or heights on each syllable. Such languages are called tone languages. A number of other languages, such as Swedish and Japanese, make a more limited use of pitch to distinguish words. These languages might best be called lexical accent languages. All tone languages and lexical accent languages also have intonation, but in general the greater a language's use of pitch for distinguishing words, the less scope it has to develop an elaborate intonation system. English, on the other hand, is not a tone language or lexical accent language, and is generally agreed to have relatively complex intonation.

This Chapter is set out as follows. Section 2 gives an introduction to what intonation consists of, and how we can visualise it and analyse it phonologically. It also draws attention to the aspects of prosody which are characteristic of English. Section 3 gives some examples of the kinds of information which intonation can carry and the intonational forms which are used in English. Section 4 looks at the variation in intonation to be found in dialects[1] of English. Section 5 concludes the Chapter with some general observations. In no respect does this Chapter attempt to give a comprehensive account, which would be impossible within its

scope; rather it samples the phenomena of English intonation to provide an overview. Readers who want more comprehensive accounts, both of English intonation and intonational theory, can follow up references in the 'Further Reading' Section as well as specific references cited in the text.

The examples of intonation patterns given in the Chapter assume, unless otherwise stated, a variety of pronunciation which has sometimes been termed 'standard Southern British English' (SBE) – the prestige variety of the south east of England which also serves in varying degrees as a prestige norm elsewhere in the British Isles. However the patterns used for examples will be similar to patterns in General American, and so the examples should be accessible not only to the large number of speakers of those two varieties but also to the much larger population of English speakers who have passive knowledge of those pronunciations.

2. What is intonation made of, and how can we represent it?

2.1 The acoustics of intonation

Figure 1 shows two acoustic analyses of the utterance 'But Melanie's never been *near* the manuscript', spoken as a sharp retort to someone who might have said for instance 'Melanie doesn't think the manuscript's genuine'. The top analysis is a spectrogram, showing how the resonances and other acoustic components of speech evolve and change over time. A phonetic transcription has been added to show roughly which parts of the signal correspond to which linguistic elements. The bottom analysis shows a plot of the fundamental frequency, the acoustic consequence of the rate at which the vocal cords are vibrating in voiced speech. The fundamental frequency contour is more or less what we hear as the changing pitch of the speech. The contour is not continuous because voiceless sounds inevitably interrupt it; and

furthermore whenever the vocal tract is obstructed the fundamental frequency is perturbed. However the general trend of the pitch is clear. The utterance starts mid-low on 'But', goes low on 'Mel(anie)', rises to a peak on 'near', and falls sharply and thereafter stays low and level. This of course is not the only way the sentence could be said, but it is one appropriate way given the context described above.

INSERT FIGURE 1 ABOUT HERE

Remember that intonational pitch works hand in hand with other prosodic dimensions, notably duration. It is clear from the spectrogram that the most prominent syllable in the utterance 'near' takes up a disproportionate time compared to other syllables. Other durational correlates of prominence are less straightforward, since they interact with segmental determinants of duration (e.g. phonological vowel length); but it can be seen for instance that the unstressed vowel of 'the' is shorter than the immediately following vowel, that of 'man(uscript)'. Note too that the trisyllable 'manuscript' is more than 50% longer than 'Melanie', also trisyllabic; this is partly as a result of the former's more complex syllable structure, but also because a lengthening of sounds (a *rallentando*) is found at the end of an intonation pattern.

2.2 General characteristics of English prosody

All languages have ways of making given linguistic elements stand out in the stream of speech, of making them 'prominent'. One or more syllables in a word may be stressed ('diversification'); and some words in an utterance will be more prominent than others ('I told you to go home'). Languages differ, however, in what might be termed their 'prominence gradient', the steepness of change between prominent and non-prominent elements. At the syllabic level, English is characterised by a steep prominence gradient. Prominent syllables have full vowels, i.e. vowels which are not schwa or unstressed /ɪ/ (as in

the first and last syllables of ‘decided’ in those dialects where schwa is not used in this context), and have relatively long durations. Non-prominent syllables often have reduced vowels (most commonly schwa). By contrast in French, for example, the average gradient between a prominent and a non-prominent syllable is less steep; French unstressed vowels are generally not reduced, and stressed syllables are less salient.

The fact that English is characterised by a steep prominence gradient is central to its intonation. One of the few things on which there has been a consensus among intonation analysts is that, put simply, interesting things happen to the pitch around prominent syllables; such syllables are associated with a pitch *landmark*. This is seen most clearly in Figure 1 in the case of the word ‘near’, which coincides with a high point, a *peak*, after which the pitch drops sharply over the whole range used in the utterance. ‘Mel(anie)’ coincides with a low point, a *trough*, after which the pitch climbs steadily to the peak. Could we look at prominence the other way round, and say ‘these syllables are prominent *because* they are associated with pitch landmarks’? The factor which breaks the circularity is that the prominence pattern of a word is independent of pitch. A word’s stress pattern, or metrical prominence pattern, is often predictable from its phonological and morphological structure; and it is also realised, mainly through timing relations, even when spoken without a pitch accent. The word ‘manuscript’ in Figure 1 has no pitch landmark associated with it (it’s low and level), but it is still apparent from the rhythm that the syllable *man-* is the stressed syllable (we will return in Section 3 to why this word should be accentually neglected in this way). In fact, if we were to resynthesise the utterance on a monotone, the prominence relations would still be completely clear. In describing English intonation, the ‘association’ of a pitch landmark with a particular stressed syllable is crucial; it is termed a *pitch accent* (or often just *accent*). The melody of an utterance consists to a large extent of the sequence of

its pitch accents, and the description and classification of these landmarks forms a central part of current models of intonation.

English, then, is a language in which there is a relatively sharp difference between prosodically prominent events and those which lack prosodic prominence. The melodic part of intonation involves tonal events associated with points of prosodic prominence, and additionally with boundaries of intonational phrases.

2.3 The phonology of intonation

Using the term 'phonology' with respect to intonation implies that there are discrete, contrastive linguistic units[2] underlying the continuously variable melody of speech, and that these units do not have meaning (any more than a phoneme has a meaning), but can function in context, singly and in combination, to convey meaning. These implications are now widely accepted.

In (1) below there are two alternative phonological (or 'intonological') analyses of the intonation of the utterance in Figure 1, the melody of which is now represented as a stylised pitch curve[3]:

(1) But ↗ MELanie's · never been \ NEAR the · manuscript

L* * H*+L * 0%

Embedded in the sequence of words (in which small capitals indicate pitch accents) are symbols from an analysis within what has become known as the British tradition, developed in works such as Palmer (1922), Kingdon (1958), O'Connor and Arnold (1961/1973) and Crystal (1969). The intonational elements are shown by the diacritics before the stressed syllables of words (the symbols used vary from author to author, but the ones chosen here illustrate the general point). Before 'near', for instance, there is a sloping line which indicates

a fall. The fall is specifically the *nucleus*, that is, the accent which occurs last and often constitutes the most salient point of the utterance. The stressed syllable of 'Melanie' initiates a pre-nuclear rise, represented by the diagonal up-arrow. The elements of the system, then, are generally pitch movements; the exception in this example being the dots before 'nev(er)' and 'man(uscript)' which mark a stressed syllable within an existing pitch trend (here rising and low level respectively).

Below the stylised pitch curve is an equivalent 'autosegmental-metrical' (AM) analysis (for the term AM, see Ladd, 1996 pp. 2-4). AM descriptions take as their atoms the H (high) and L (low) tones of autosegmental phonology, originally applied to tone languages, combining these tones when needed into 'bitonal' (or potentially larger) elements. The Hs and Ls constitute pitch targets, and pitch movements arise from interpolating between ('joining up') these targets. The 'metrical' part of the name arises because, crucially, certain tones are tied to metrically prominent events in the utterance (in effect stressed syllables) as noted in 2.2 above; this is represented in the notation by adding an asterisk to the tone. Thus the syllable 'near' in the example is stressed and associated specifically with the high tone of the H*+L bitonal pitch accent. Metrically strong syllables without a pitch accent are not marked in most AM transcription systems, but logically could be shown as here by an asterisk.

The AM framework became the dominant paradigm in intonational research under the influence of Pierrehumbert (1980) and subsequent work, for instance Beckman and Pierrehumbert (1986) (for an introduction to AM and a critique see Ladd, 1996). A modified version of Pierrehumbert's (1980) description is expressed in the ToBI transcription system which was agreed on as a unified set of conventions for transcribing American English, particularly in work on speech corpora (see Silverman et al., 1992; Beckman, 1999); and a number of language-specific adaptations such as G-ToBI for German (Baumann, Grice and

Benzmüller, 2001) and ToDI for Dutch (Gussenhoven, Rietveld and Terken, 1999). The particular variant of the AM class of descriptions used here is the IViE system (the acronym standing for Intonational Variation in English) which was developed as part of a research project[4] into the intonation of a number of urban centres in the British Isles.

Superficially the British and AM analyses look very different, but there is a high degree of compatibility. Most of the intonational phenomena which can be expressed in one can be expressed in the other, and some of the differences between specific analyses in the two traditions are incidental. One essential difference, however, concerns the boundary of an intonation unit, or *intonational phrase* (IP) as it is now commonly known. An essential task in making an intonation analysis is to divide the speech into intonational phrases. These may be separated by pauses, but more often in fluent speech the end of an intonational phrase will be marked (if at all) only by a degree of slowing (pre-boundary lengthening), and the real essence of an intonational phrase is its internal coherence in terms of intonation pattern (rather in the way that we don't expect to find a gap between syllables, but rely for their demarcation on their internal coherence in terms of lawful combinations of sounds). AM models assume that an intonational phrase boundary may (or in most versions must) have a *boundary tone* associated with it. We can illustrate this if we imagine a reply to 'But Melanie's never been near the manuscript' consisting of an incredulous 'Never?!' with an overall falling-rising contour. A 'British' analysis would classify this as a fall-rise pitch accent. IViE would regard it as H*+L H%, with the final H% indicating a tone 'belonging' to the intonational phrase boundary. On the face of it these seem equivalent, but if we add more material to the response while keeping the pattern equivalent, and leaving the main stress on 'Never', we will find that the rising part of the fall-rise is delayed to the end:

(2) NEVer?! She's NEVer seen the manuscript?!

H*+L H% H*+L * H%

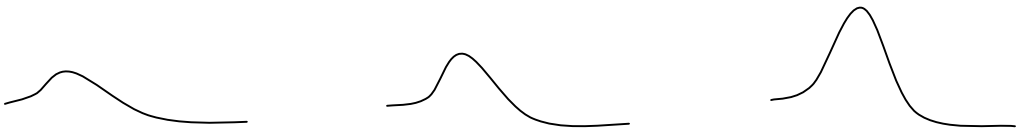
Phenomena like this suggest that intonational equivalence is captured more transparently through the use of boundary tones. However it is still useful to recognise the coherence of patterns such as H*+L H%, and the combination can be called a (nuclear) *tune*.

Although IViE acknowledges the importance of boundary tones, it allows IP-final boundaries to be tonally unspecified (0%) when there is no pitch movement in the immediate vicinity, unlike most AM models which require H% or L% to be specified. In doing this, it merely extends and makes explicit the practice in other models of not specifying tone on many IP-initial boundaries. Henceforth in this chapter examples will be presented and discussed in terms of the IViE transcription system, albeit a somewhat simplified version. For the full IViE inventory of pitch accents, boundary tones, and intonational processes see for instance Grabe, Nolan and Farrar (1998) and Grabe (2001).

2.4 Non-phonological components of intonation

Not all intonational effects lend themselves to analysis in terms of discrete categories such as pitch accents and boundary tones. Other intonational effects are communicative in the sense that the speaker has a choice, but are essentially gradient. For instance each of the following ways of saying an utterance conveys progressively greater involvement (whether or not this is the speaker's true feeling):

(3) I'd LOVE to meet him I'd LOVE to meet him I'd LOVE to meet him



but identifying three gradations (rather than four, or seven, or more) is arbitrary; *pitch range* here behaves as a continuum.

This non-categorical aspect of intonation probably provides a link to the origin of intonation in very basic physical and physiological phenomena. In order to explain certain universal tendencies in the use of pitch Gussenhoven (2002), building on earlier work by Ohala (e.g. 1983, 1984), proposes three *biological codes*: the *frequency code*, the *effort code*, and the *production code* (which I will rename the *respiratory code*). For instance, small objects or animals produce high frequencies, and so high pitch is a natural way to signal submissiveness in the animal kingdom, and by (metaphorical) extension politeness or uncertainty (among other things) in human interaction – the frequency code. Greater physical effort, resulting from physiological arousal, will produce more energetic movements, and more dramatic pitch change, and by extension can naturally signal involvement (as in (3)) or linguistic emphasis – the effort code. And as vocalisation proceeds, air is used up, subglottal pressure drops, and the natural tendency is for pitch to get lower in the course of a vocalisation, so it may be natural to signal newness by high pitch and older information by lower pitch – the respiratory code. Quite possibly the categories of intonational phonology represent in some measure the *grammaticalisation* of these codes; it is tempting to see the use of H% in (some) questions as arising from the frequency code. We shall see in section 3 that the task of intonational signalling in English is shared between a discrete, clearly phonological resource and a gradient component.

Relatively little attention has been paid to systematising the description of the non-categorical part of English intonation (though Crystal (1969) does discuss many relevant

phenomena). A useful prerequisite to understanding those aspects involving pitch range (best used as a 'catch all' term) is a clear set of terminology. We can distinguish the following: *speaking tessitura*, a given speaker's range of comfortable speaking pitch; *pitch level*, the overall placement of an utterance within a speaker's tessitura; *pitch span*, the general distance between highs and lows in an utterance; *pitch excursion*, a local high–low distance, e.g. associated with a pitch accent; and *downtrend*, the lowering of pitch over the course of an utterance. In these terms the degrees of involvement in (3) are signalled by changes in pitch span (manifested in the excursion of a single pitch accent, but if the utterance were longer the changes would affect the whole of the utterance).

3. Functions and forms of English intonation

Section 2 introduced some of the general concepts required for understanding intonation. This section exemplifies how English intonation carries a number of different kinds of information.

3.1 Grammatical structure

An important role of intonation is as the 'punctuation' of spoken languages, marking the division between grammatical units and more generally helping the listener to follow the utterance. The function is brought sharply into focus on occasion when the words used allow more than one grammatical parse, for instance 'While eating my dog my cat and I watched television'. In writing we would use a comma; after 'dog' for the more unsavoury interpretation, and after 'eating' (and probably another comma separating 'my dog' and 'my cat') for the pleasanter interpretation. An intonational equivalent of this comma in these two

positions is transcribed in (4) and (5) respectively – a falling pitch accent followed, crucially, by a high boundary tone, along with a slowing down before the boundary:

(4) While EATing my D O G my CAT and I WATCHed TELevision

H*+L H%

(5) While EAT i n g my DOG my CAT and I WATCHed TELevision

H*+L H%

Note, however, that the relation between grammatical units and intonational units is not one-to-one. It is possible to phrase the following sentence intonationally in at least two ways:

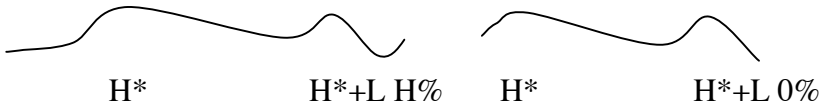
(6) If you're READy we'll G O If you're READy we'll G O

H*+L H% H*+L 0% H* H*+L 0%

without there being any corresponding change in grammatical structure. We might regard the change as a kind of 'connected speech process' like segmental assimilation, correlated with – but not directly determined by – speech rate. In general, then, we can regard grammatical structure as determining the point at which intonational phrase boundaries can occur, but whether they do or not depends on performance factors such as speech rate. The slower and more careful the speech, the more explicitly will grammatical structure be signalled in intonational phrasing.

In some cases intonation can guide the listener to grammatical structure which is not directly to do with phrasing. For instance the intonation of the words 'The Norwegians who are rich enjoy life to the full' can signal whether the relative clause is restrictive, meaning that, specifically, rich Norwegians enjoy life to the full:

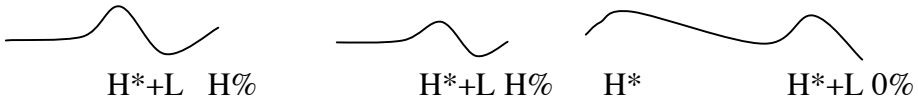
(7) The NorWEGians who are R I CH enJOY life to the F U LL



H* H*+L H% H* H*+L 0%

or whether the relative clause is non-restrictive, implying that all Norwegians are rich, and having a status more like a parenthetical remark (e.g. '…and they're rich…'):

(8) The NorWEGians who are RICH and they're RICH enJOY life to the F U LL



H*+L H% H*+L H% H* H*+L 0%

Whilst cases of intonational disambiguation such as the ones above are useful for illustrative purposes, intonation provides guidance to the grammatical structure of all speech.

3.2 Information structure

Another thing which intonation does is to highlight points of high informational importance in the utterance. Each word in the lexicon has a stressed syllable, or, perhaps better, a 'stressable' syllable. This means that this syllable has the potential to be the site of prosodic prominence in an utterance. The prominence is usually manifested as greater duration, greater intensity (the primary physical correlate of loudness), and in the majority of cases a pitch accent. In the word 'about' it is the second syllable which is stressable. If we cite 'about' in isolation (9), the second syllable will carry a pitch accent — often H*+L. If however we say the word as part of the utterance 'I'll be at the station about five', there will be by default no prominence on the second syllable of 'about' beyond what may be perceived as a result of the 'full vowel' (in this case a diphthong) it contains and its rhythmic context. But if, again, the specified time is already present in the discourse, and the speaker wants to

focus on the approximation implied by the preposition ‘about’ (‘no, don’t buy tickets for the 5.02, it’s too risky’), then that word can carry a pitch accent (rightmost example in (9)).

(9)

aBOUT	I’ll BE there about FIVE	I’ll BE there aBOUT five
		
H*+L 0%	H* H*+L 0%	H* H*+L 0%

This exemplifies an important principle, that the speaker adjusts prominence according to communicational need. In the citation utterance there is no redundancy (i.e. predictability), and no word which is more important than ‘about’. In the sentence uttered when the specified time is new information, ‘five’ is more important, and the presence of a temporal preposition is predictable from the rest of the sentence. It would be most unnatural to speak a sentence putting a pitch accent on every word, and as a first rule of thumb we can expect content words to have a pitch accent and grammatical words to lack one.

In fact at the same time as associating ‘about’ with a pitch accent the speaker has robbed ‘five’ of the prominence it had the first time round. This kind of adjustment of prominence is a crucial feature of English intonation, often called *deaccenting*[5]. By de-accenting ‘five’, focus has been placed on ‘about’; and ‘five’, which is *given* information, is relegated to a lower level of salience. Deaccenting happens when a word is given by virtue of being repeated (10) or being substituted by a hypernym (11):

(10) I OFFered her a COFFee but it TURNS out she doesn’t DRINK coffee

(11) I OFFered her a BEER but it TURNS out she doesn’t DRINK alcohol

In such examples it is intonationally ill-formed in English[6] — and will give rise to a perceptual double-take on the part of the listener — if the given item carries prominence

equal to that of its first occurrence. In contrast many languages, such as Italian and Romanian (Ladd 1996, pp. 176-7), do not typically have deaccenting of given information. Absence of deaccenting in a language, however, does not necessarily mean that givenness goes unsignalled. In Icelandic, which does not deaccent given information (Nolan and Jónsdóttir, 2001), it seems that the information structure is reflected in gradient prominence levels, and deaccenting may just be a grammaticalisation of a very general reflex of the effort code.

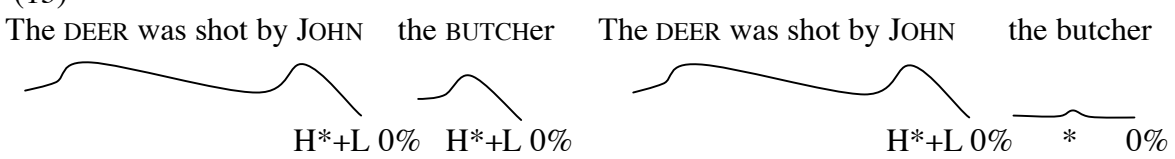
So far the use of intonational pitch accents in English seems rather logical; informationally rich items are made to stand out and other information is backgrounded by deaccenting. But it has long been remarked that the relation between information and accent is not always so transparent, as in cases such as the following:

(12) Look OUT! That CHAIR's broken

In the context of someone about to sit down, 'chair' is contextually given, and being broken is the unexpected, crucial information. Yet, perversely at first sight, 'chair' gets the main accent. But this kind of accentuation is probably the intonational equivalent of pointing; first make sure the listener looks at the chair, because then the problem will be perceived directly.

Also initially opaque is the kind of contrast between the following utterances:

(13)



In the first version 'butcher' is in apposition, and explains that John is the butcher. It's rather like a reduced non-restrictive relative clause. The pitch accent on the item in apposition ('butcher') usually echoes the pitch accent on the word to which it is in apposition ('John'), but with a less extensive pitch excursion. In the second version on the other hand 'butcher' is

an evaluative epithet, a metaphorical application of the word expressing (here) the speaker's disapproval of John's recreational pursuits. It carries a rhythmic stress, indicated here by the asterisk, but no pitch accent. This deaccenting is conventional, but not easy to explain. Conceivably it is a grammaticalised form of the reduced pitch span which often accompanies parenthetical expressions, including expressions of opinion, as in 'John — and I think he's a butcher because of it — is the one who shot the deer.'

A comprehensive account of the relation of intonation to information structure would be too lengthy for the scope of this chapter, but as a final, very specific case, consider the following:

(14) EMma doesn't dance with ANYone

H* H*+L 0%

EMma doesn't dance with ANYone

H* H*+L H%

In reply to 'why didn't she dance with Wayne?' the first version, with a low boundary tone, means that Emma will refuse all men who ask her to dance without exception. The second, with a high boundary tone, means that Emma is selective; she doesn't accept just *any* offer. The difference may arise from two broad categories of intonational meaning that have been associated with boundary tones. Low endings are thought of as assertive and non-continuative, for which Cruttenden (1997, p.163) has proposed the term *closed*, and high endings as non-assertive and continuative, or *open*. Thus the high boundary tone in the second version leaves it open for the speaker to express, or the listener to infer, a qualification, e.g. ' – but she'll say yes if the man looks rich'.

3.3 Discourse function

The best know fact about intonation is that questions rise. Like most well known facts it is a considerable oversimplification. Counterexamples are easy to find. English 'Wh-' questions in particular are more often falling at the end than rising:

(15) WHAT are you DOing on SATurday? How OLD is he?

H* H* H*+L 0% H*+L 0%

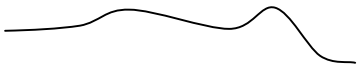
Nonetheless the popular belief that the voice goes up in questions has some basis in truth. 'Yes-no' (or 'general') questions can rise:

(16) Have you FINished the ARTicle? OR Have you FINished the ARTicle?

H* H*+L H% H* L*+H H%

These two versions are both common; the first has a falling rising pattern on the last word, and the second steps down to the final word but then rises to the end[7]. Ending high is in keeping with the *open—closed* distinction mentioned above, and Gussenhoven's *frequency code* and *respiratory code* (Section 2). The questioner perhaps metaphorically submits to the greater knowledge of the hearer, and leaves it open to the listener to provide completive information. However it is still perfectly well-formed to say:

(17) Have you FINished the ARTicle?



H* H*+L 0%

One might nonetheless assume that if there is nothing in the words to indicate that an utterance is a question (a 'morphosyntactically unmarked question') then the phonological choice of a high boundary tone would be obligatory; nevertheless the second utterance below will be interpreted as a question:

(18) She's FINished the ARTicle OR She's FINished the ARTicle?

H* H*+L 0%

H* H*+L 0%

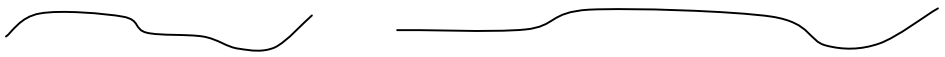
The question is marked by gradient aspects of pitch range; the *downtrend* is less steep, and the *pitch excursion* of the nuclear accent is greater. In tone languages, where local pitch movements are determined lexically, intonation will rely heavily on such pitch range effects. In English there is a rich and to some extent complementary interplay in the signalling of discourse function between morphosyntactic marking, discrete intonational marking, and gradient intonational marking.

3.4 Attitude and the speaker's state

From the brief survey above concerning questions it can be seen very clearly that there is no one-to-one mapping between discourse function and intonation pattern. Some of the reason for this is that intonation is also doing other, less linguistic, work, conveying information for instance about the speaker's attitude. The example (17) of a question ending in a fall is unambiguously a question (because of the syntax), but a rather less genial, more demanding one than those in (16). Furthermore although we have tacitly assumed that statements are *closed* and are associated with low endings, not every statement ends low. Most famously, the spread through many varieties of English of the 'high rising terminal' (see e.g. Fletcher, Wales, Stirling and Mushin, 2002) – the trend to end intonational phrases

on a high and rising pitch – has made rising intonation on non-question utterances commonplace, as for instance in examples like the following (where !H* indicates a lowered or *downstepped* high accent):

(19) MY name's JOHN SMITH. I've got an apPOINTment with Dr SANDerson.



H* !H* !H* H% H* !H* H%

The speaker is not asking for information, but is more probably using a signal for non-assertiveness (the *frequency code*) as a politeness strategy.

There is no denying the role of intonation in conveying attitude, as witness both the common observation that the problem was 'not what he said but the way that he said it', and the large amount of attention devoted to the attitudinal function of intonation in books tutoring learners of English. However with attitude we are entering particularly difficult territory. Not only is someone's attitude hard to describe (much harder, say, than the linguistic description of an utterance as a declarative consisting of two clauses and functioning as a question), but also a person's attitude shades into their psychological state. Whilst choosing a 'polite' or 'informal' intonation is primarily a matter of attitude, a person whose intonation might be described as 'angry' may be genuinely experiencing that emotion and expressing it unchecked, may be trying with only partial success to hide it, or may be feigning anger to signal that the matter in hand is one which deserves condemnation. There is a large body of work on how speech is affected by actual emotions and psychological states (see e.g. Scherer, 2001), but these non-linguistic determinants lie outside the scope of this Chapter.

As we have seen in (16-17) and (19), categorical choices are available in English to convey attitude. But as we would expect from the link between attitude and psychological

state, the deliberate communication of attitude also employs devices which directly reflect Gussenhoven's (2002) *biological codes*. The gradations of *pitch span* in (3) on the words 'I'd love to meet him' directly mimic (or indeed are) the effects of physiological arousal, and convey progressively greater involvement. It is tempting to say 'greater enthusiasm', but we must beware of attributing specific meanings to intonational effects; if we impose a similar continuum of increasing pitch spans on the reply 'I rather *not* meet him', the strength of feeling is mapped in a similar way, but we can no longer label it enthusiasm.

One aspect of attitude is *accommodation*, the degree to which a speaker matches the speech of an interlocutor. Undoubtedly prosodic accommodation occurs widely. For instance if one person uses whispery phonation and a reduced pitch span, their interlocutor may well do the same. Failure to accommodate pitch span, for instance, can lead to ill-formed exchanges; if the intention of the third utterance in (20) is genuinely to congratulate, the response is appropriate to an utterance in the manner of the first, both in terms of phonological choices and pitch span, but not the second, against which it will sound somewhat grudging:

(20) I've JUST been proMOTed — I've JUST been pro M O T ed — ConGRAtuLATions

H* H*+L 0% %H L* H*+L 0% H* H*+L 0%

3.5 Discourse regulation

In a successful conversation *turn-taking* by the speakers happens smoothly. Depending on the type and degree of formality of the interaction, interruptions may be appropriate, but they will be recognisable as such by the participants, as will the point at which a speaker has

finished what he or she has to say. The 'traffic signals' which regulate a well-formed interaction are mainly intonational.

End-of-turn markers include low pitch, reduced loudness, and rallentando (lengthening of turn-final elements). The low ending and lengthening (indicated by the stretched spacing of the text) in the first utterance in (21) give it an air of finality. This does not preclude further comment on the topic (e.g. a question about it from the listener), but it does open the floor to another speaker. On the other hand the lack of slowing (or even accelerando) in the second utterance, combined with sustained final high pitch often used in listing items, indicates that more is to come and the speaker is not willing to yield the floor.

(21)

…then we went to the SHOPp i n g c e n t r e

…then we went to the SHOPping centre

Again we can relate this intonational use of pitch to Gussenhoven's (2002) biological codes. The *respiratory code* ('production code' in his terms) links low pitch and finality by virtue of the reduction in subglottal pressure as air is used up in speaking, and this link could be extended metaphorically to a conversational turn. Conversely attempts to wrest the floor from the speaker will be characterised by high pitch and loudness.

4. Intonational variation

Varieties of languages are marked not only by their vowels and consonants but also by their prosody. The intonation of some varieties is often remarked on by outsiders using terms such as 'sing-songy' or 'flat'. One of the most distinctive dialects of English from the intonational point of view is Northern Irish English (NIE), which 'always goes up at the end'. The truth is a little more complex, as shown in (22).

(22)

L*+H 0% L*+H 0% L*+H H%

NIE SBE

The first and second patterns show the commonest nuclear 'tune' of NIE. The first pattern shows what happens on short (usually monosyllabic) phonetic material, such as the answer 'three' to the question 'how many?'. It looks and sounds pretty much like a rise; but as soon as the phonetic material becomes longer (e.g. 'three of them') as in the second pattern, it becomes clear that the 'underlying' pattern is a 'rise-plateau'. This nuclear tune can be analysed within the IViE system as L*+H 0%. This is a pattern which seems not to occur in Southern British English (SBE), or most other dialects; as shown in the third schema a nuclear rise co-occurs in SBE only with a high boundary tone (and the tune functions as a question, not a statement).

Here we have what appears to be a phonological difference between dialects, specifically a difference – similar to a segmental phonotactic difference – determining the permissible combination of phonological elements or possible *tunes*. It is also possible in NIE to drop sharply at the end of the plateau to an L% boundary, again yielding a tune which is not available in SBE or most other dialects.

There are (at least) two other ways in which dialects can manifest a difference in their intonational phonology. First, dialects can differ in terms of what intonological elements they have in their inventory, just as a dialect may lack a phoneme (SBE does not have the voiceless labial-velar which distinguishes 'what' from 'watt', while Scottish does, for instance). The intonational inventory will, of course, depend on analytic assumptions; one could dispose of the segmental difference just mentioned by treating the voiceless labial-

velar as the combination of /h/ and /w/. Within the IViE framework, which assumes that an intonational phrase boundary tone T% will be manifested by pitch movement directly adjacent to the boundary, it seems that SBE lacks an L% boundary in its inventory. Nuclear falls are accounted for as H*+L, reflecting the fact that as material is added after the nuclear syllable, the low pitch is still attained shortly after the accented syllable and not at the boundary, as in (23). There are no cases where a fall can be associated unambiguously with the boundary and not with a prominent syllable, contrary to the NIE pattern discussed above.

(23) JOHN JONathan was the name of that man I was thinking of

H*+L 0% H*+L 0%

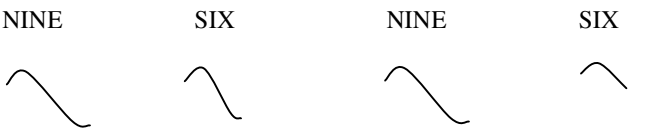
Second, the association of intonational elements with functions and meanings shows considerable variation between dialects. Grabe and Post (2002) examined read statements and inversion questions in the IViE corpus and found the distribution of nuclear tunes (last pitch accent and boundary tone) shown in Figure 2 for SBE (Cambridge) and NIE (Belfast). It can be seen that Belfast uses predominantly the rise-plateau L*+H 0% pattern in statements, and overwhelmingly in questions, revealing that these utterance types are generally not phonologically distinct. In Cambridge, statements mostly have a falling nucleus – a straightforward difference in usage. Almost half of the inversion questions also have this pattern, but the option exists to use a rise (L*+H H%) or a fall-rise (H*+L H%). As an aside, informal polling of students in Cambridge by the author, involving presenting a polite inversion question with each of these two patterns and asking 'which is more old-fashioned', has consistently shown the rise to be perceived as the 'old-fashioned' alternative. The subtlety of intonational variation is underlined by Ladd (1996: 122) who notes that the fall-rise nuclear tune H*+L H% on a request such as 'Can I have the BILL please?', which is

perfectly polite in British English, may be heard as condescending or peremptory by a speaker of American English.

INSERT FIGURE 2 ABOUT HERE

So far we have looked at intonational variation that can be analysed in terms of discrete phonological categories. There are also differences which are a matter of phonetic realisation. One such is the way a dialect behaves under 'tonal crowding', that is, when there is only a very short time, because of limited phonetic material, to achieve several intonational targets (Hs and Ls). Idealising somewhat, there are two possibilities: to 'compress', and try to squeeze all the targets into the available time; or to 'truncate', and give up on achieving one or more targets. These strategies are schematised in (24):

(24)



compressing truncating

The compressing dialect on the left attempts to realise the full fall despite the very short vocalic nucleus of 'six' (short because of the phonologically lax vowel, and pre-fortis clipping) by making the pitch change steeper. The truncating dialect on the right does not alter the rate of pitch change, and 'runs out of road' leaving an incomplete fall[8]. Hungarian has been described as a 'truncating' language (Ladd 1996, 132-136), while English is thought of as 'compressing'. Grabe (1998) showed that German truncates falls but compresses rises.

Table 1 summarises results in Grabe, Post, Nolan and Farrar (2000) for four dialects of English (with German added for comparison). It can be seen that SBE conforms to the stereotype of English as a compressing language, as does Newcastle. Leeds, despite being similar to SBE in terms of its intonational phonology, is truncating when it comes to

realisation, as is Belfast (which as we have seen is phonologically unusual, and lacks the rises on which to test this parameter).

	RISE	FALL
SBE	compresses	compresses
Newcastle	compresses	compresses
German	*compresses*	*truncates*
Leeds	truncates	truncates
Belfast	truncates	–

Table 1. Summary of truncation and compression of nuclear pitch accents in four English dialects.

Another source of realisational differences is the way in which intonational targets align with segmental material. In the extreme, alignment differences pretty much oblige us to recognise a phonological difference, as in the case schematised in Figure 3 of Connaught and Donegal Irish (Gaelic) reported by Dalton and Ní Chasaide (2003). It is tempting, and probably realistic, to speculate that the Donegal pattern might have developed as a result of a progressive historic drift rightwards of the intonational targets relative to the segments; but within our current intonational models it would be stretching credulity to do other than recognise Connaught as having H* accents and Donegal as having L* accents.

INSERT FIGURE 3 ABOUT HERE

On the other hand, take the comparison schematised in Figure 4 between SBE and the Scottish dialect of Anstruther, Fife (based on Aufterbeck 2003). In SBE (thin line), peaks are aligned with the accented syllables. In Fife, the peaks lag, and the accented syllable itself manifests a perceptually salient upglide. After the nuclear peak, the pitch also declines more gradually than in SBE. This impressionistic description captures the difference, but is the difference phonological (as we decided Donegal vs. Connaught Irish had to be), or realisational?[9] Aufterbeck argues that the difference here is realisational, and, in effect, that both dialects are associating prominent syllables with high rather than low pitch. This view is

in keeping with Farrar and Nolan (1999) who demonstrated that (utterance initial) H* peaks in SBE were not tightly tied to the accented syllable, being allowed to lag when there were no utterance-initial unstressed syllables – a case of tonal 'allophony'. Recognising SBE allophonically lagged peaks as H* opened the way to treating more severely lagged peaks in other dialects, such as Newcastle, as H* despite relatively low pitch on the accented syllable.

INSERT FIGURE 4 ABOUT HERE

Acknowledging that a substantial amount of intonational variation is realisational rather than a difference of phonological system may explain why there is relatively good between-dialect comprehension of intonation – occasional misinterpretation of affect notwithstanding. As we move from varieties of English which are historically indigenous to the British Isles to those which have emerged world wide, however, we find cases of fundamental prosodic differences influenced by substratum languages. These may give rise to comprehension difficulties. I will focus on one, potentially interrelated, cluster of prosodic differences.

It has long been recognised that languages can differ in terms of rhythm, and this is sometimes discussed in terms of *syllable-timing* and *stress-timing* (cf. Abercrombie 1967: 96-98). In the ideal syllable-timed language, each syllable would take up the same amount of time, or be *isochronous*, whereas in the ideal stress-timed language, it is the *stress-foot* which would be isochronous (the stress-foot consists of a stressed syllable plus any unstressed syllables which intervene before the next stress). According to this view French is a good example of syllable-timing, and English is a good example of stress-timing. In reality, however, experimental phonetics has failed to support either isochrony in any strict sense or a polar division of languages into two types. Nevertheless the impression which these terms sought to capture is real, and can be quantified. Recently progress has been made using a number of measures including the Pairwise Variability Index (PVI). The PVI simply

expresses the average difference between successive pairs of phonetic units – in duration, intensity, or vowel quality. It turns out, for instance, that as expected French has a lower durational PVI value for vowels and consonants than English (Grabe and Low 2002), reflecting more evenly timed syllables (well short of isochrony, of course).

The first application of the PVI was in fact to dialects of English, in a comparison of SBE and Singapore English – the latter of which has been described as 'syllable-timed'. Low (1998) and Low, Grabe and Nolan (2000) showed that, compared to SBE, Singapore English had less pairwise variability in vowel duration[10], vowel intensity, and vowel spectral dispersion (how peripheral a vowel is in the acoustic vowel space). To a large extent this reflects the fact that Singapore English is much more reluctant than SBE to reduce unstressed vowels to schwa. Singapore English could be said to have on average a less steep *prominence gradient* between syllables than SBE.

Separately, Low (1998) demonstrated that speakers of Singapore English do not deaccent given information (see section 3); they are quite happy to say things like *I* OFFered *her* COFFee *but she doesn't* DRINK COFFee, with a full accent on the second occurrence of 'coffee'. The strategy of backgrounding less important parts of the utterance by intonational means seems not to be grammaticalised. It is intriguing to speculate that at the level of pitch accents, too, Singapore English has a less steep prominence gradient; there may be a scaling of pitch accents according to information, but radical reduction (to zero) is not an option. It remains to be investigated whether there really is a systematic scaling of pitch accents according to information structure (short of deaccenting), or whether this kind of intonational signalling of informational value is simply absent. What is clear is that the lack of vowel reduction and the lack of deaccenting conspire to make Singapore prosodically radically different from (e.g.) SBE, and create problems for speakers of SBE in lexical access and comprehension. Deterding (1994:71) notes that the British model of intonation 'is

inappropriate for [Singapore English], because there is no clear nucleus acting as the focus of information or anchor for information within each intonational phrase', and it is almost certain that other world varieties of English will pose a similar challenge to our ingrained assumptions about English intonation.'

5. Conclusion

One of the 'design features' of speech is that pitch is variable independently of the sounds being produced. This is possible because the rate of vibration of the larynx does not have to match a resonant frequency of the vocal tract (unlike a brass player's lips, the vibration of which is coupled to a resonance of the tube which makes up the instrument). As a consequence pitch can be recruited to carry information over and above that borne by the vowels and consonants of language, functioning (as we saw in Section 1) either as lexically significant tone, or non-lexically as intonation. In doing so, pitch operates in tandem with durational factors and loudness.

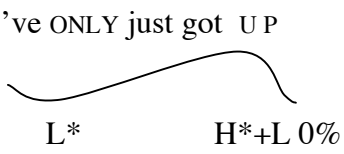
Intonation, as an information channel independent of the words chosen, carries a number of quite distinct strands of information. We have seen that the ways in which it does so include signals mirroring physiologically-determined changes in pitch, on the one hand, and abstract phonological categories on the other. The latter may originally derive from grammaticalisation of biologically-determined frequency effects, but the status of phonological intonational categories as members of an abstract linguistic system means that their relationship to information is potentially arbitrary.

This arbitrariness should lead us to expect variation across languages and dialects, and Section 4 discussed such variation between dialects. Even those intonational effects whose basis in biology is more transparent are highly conventionalised, and so can vary.

Intonation, then, is just as significant a component of a dialect as the pronunciation of its vowels and consonants.

English is generally regarded as having a complex intonation system. English, of course, is not a tone language and so intonational categories can flourish without competition for the resource of pitch variation. But even among non-tone languages English seems to rely rather heavily on intonation for signalling. Schubiger (1965) compares English to German, which often uses pragmatic particles where English uses intonation. For instance, she cites 'rejoinders with the connotation "by the way you talk (or act) one would think you didn't know (or were ignorant of the circumstances)"', which in German naturally include the particle 'doch', for instance 'Ich bin doch eben erst aufgestanden' ('I've only just got up'). 'Doch' does not readily translate lexically, but the connotation is achieved in English by a low pre-nuclear accent:

(25)



It may seem to be stretching a point to claim unusual complexity for English intonation from this one little corner of information signalling, but whether or not the claim that English is unusual in the richness of its intonation can be proved there is no doubt that English intonation remains a highly elaborate and flexible communicative resource. This Chapter has sought to give an overview of some of the ways English intonation is used to convey a wide variety of information.

6. Further reading

For an accessible and wide-ranging all-round introduction to the forms and functions of intonation, focusing on English, see Cruttenden (1997), while Ladd (1996) provides an objective overview and critique of the autosegmental-metrical approach to intonational phonology, and explores several problematic areas in the description of intonation including the definition and use of pitch range.

Gussenhoven (2004) deals with the tonal and intonational use of pitch across languages and discusses what is universal or language specific, and Hirst and Di Cristo (1998) offers a compendium of descriptions of the intonation of a large selection of languages.

A classic (and highly detailed) analysis of the prosody of British English within the 'British' descriptive framework is to be found in Crystal (1969), while more pedagogically oriented descriptions within the same tradition are provided by O'Connor and Arnold (1961/1973) and Couper-Kuhlen (1986).

Pierrehumbert (1980) is pivotal in theoretical terms, marking as it does the first comprehensive application of autosegmental mechanisms to the description of English intonation. It also provides wide overview of patterns found in American English. The ToBI transcription system, based on Pierrehumbert (1980), and information about its adaptation to other languages can be accessed on the web at http://www.ling.ohio-state.edu/~tobi/. Information about IViE, a further adaptation aimed for English dialect intonation, and references to work on intonational variation in the British Isles, can be found at http://www.phon.ox.ac.uk/~esther/ivyweb/.

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Figure Captions

Figure 1

Acoustic representations of 'But Melanie's never been *near* the manuscript'. Top, spectrogram revealing segmental timing information; and bottom, time-aligned fundamental frequency contour.

Figure 2

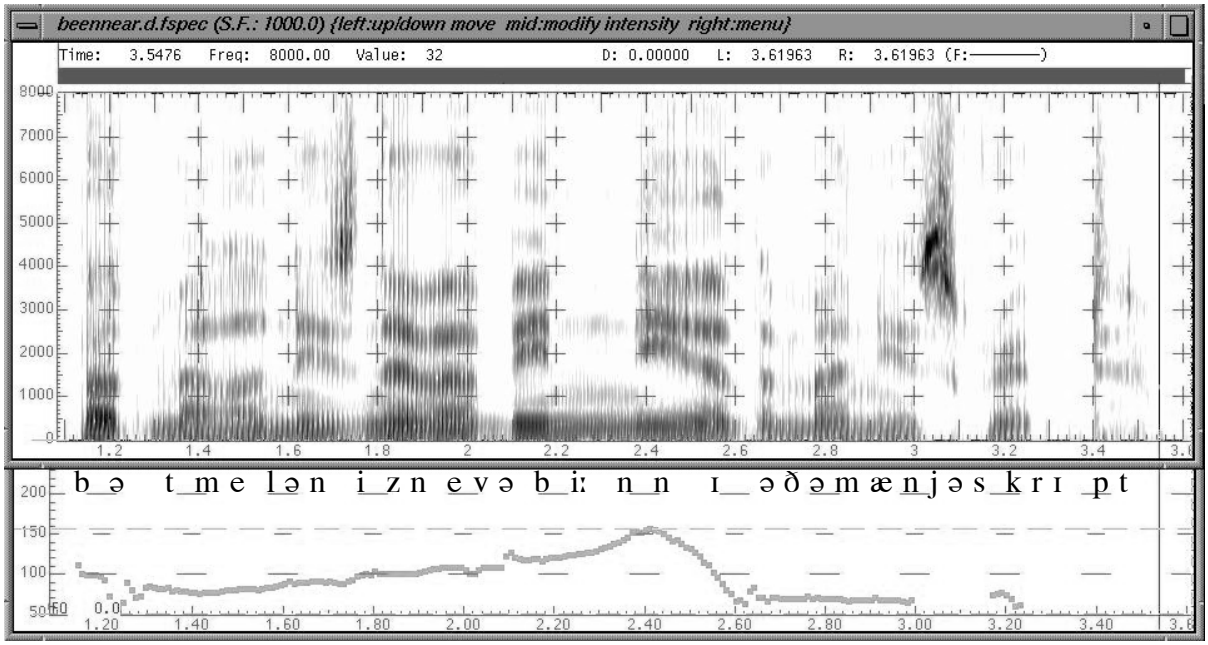
Distribution of patterns between statements and inversion questions (after Grabe and Post 2002).

Figure 3

Schematic representation of the alignment of intonation pitch relative to prominent syllables (shown as boxes) in two dialects of Irish (Gaelic). The rectangles indicate the alignment of accented syllables.

Figure 4

Schematic comparison of lagged peaks (heavy line) as in Scottish English and aligned peaks. The rectangles indicate the alignment of accented syllables.


beennear.d.fspec (S.F.: 1000.0) {left:up/down move mid:modify intensity right:menu}
Time: 3.5476 Freq: 8000.00 Value: 32 D: 0.00000 L: 3.61963 R: 3.61963 (F:————)
8000
7000
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2000
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1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.2 3.4
b ə t m e l ə n i z n e v ə b iː n n ɪ ə ð ə m æ n j ə s k r ɪ p t
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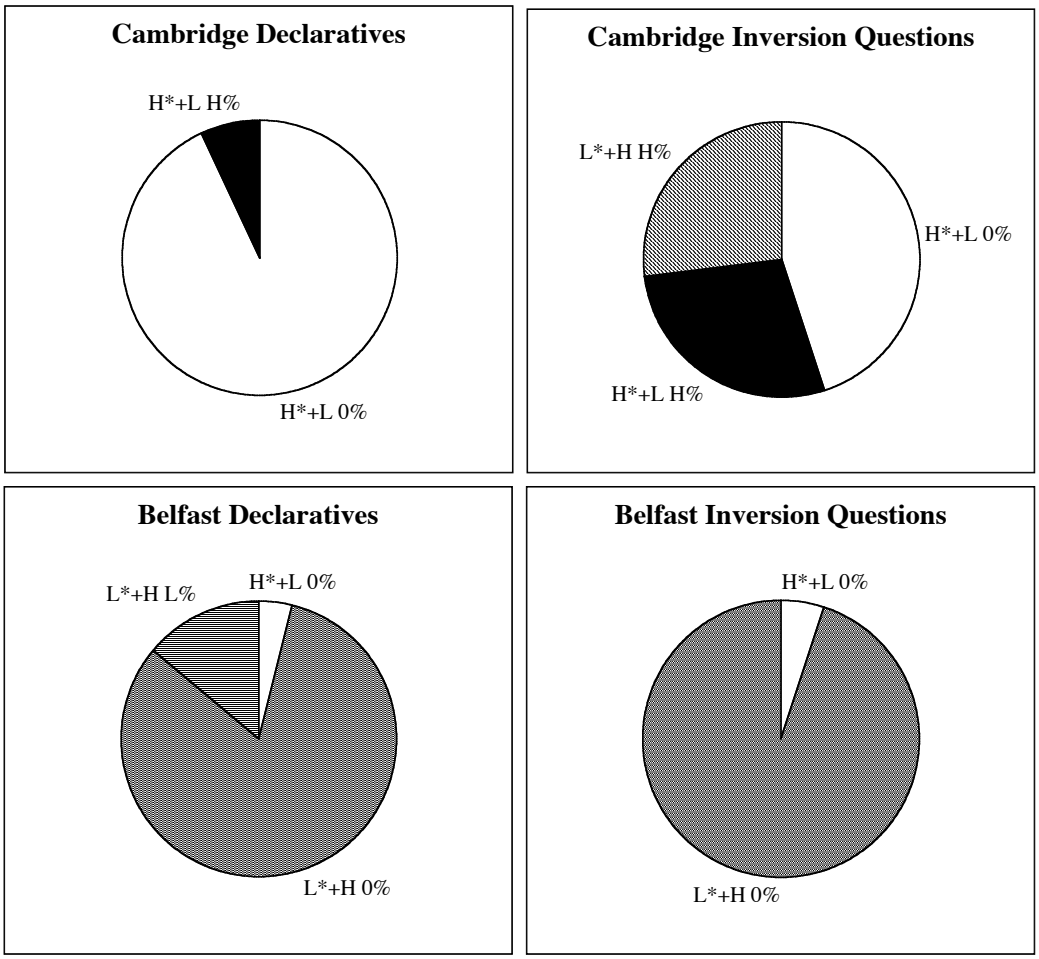
Cambridge Declaratives
H*+L H%
H*+L 0%
Cambridge Inversion Questions
L*+H H%
H*+L 0%
H*+L H%
Belfast Declaratives
L*+H L%
H*+L 0%
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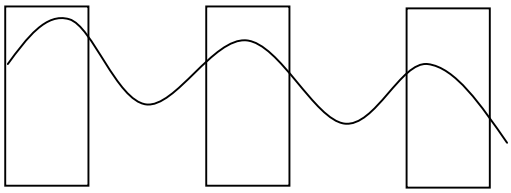
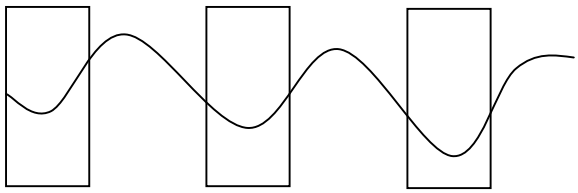
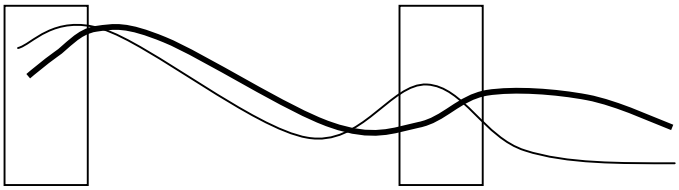
Belfast Inversion Questions
H*+L 0%
L*+H 0%



Connaught



Donegal



WHERE is the nearest A I R port

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Sem. A-08

FEATURES OF CONNECTED SPEECH

Every utterance is a continuous, changing pattern of sound quality with associated features of quantity, pitch and stress. It is important to note that a word in isolation is pronounced differently to the pressures of its sound environment or of the accentual or rhythmic group of which it forms part.

These variations may affect the word as a whole, e.g. **weak forms** of structural words in an unaccented situation; or it may especially affect the sound used at word boundaries, which will undergo a series of phonetic adjustments e.g. **assimilations, elisions** and **liaison forms.** The extent of these variations will depend mostly on the speed of the utterance, since the slower and more careful the delivery, the greater the tendency to maintain a form near to that of the isolate word.

We do not always speak in the same way, but we adapt ourselves to situations by using different styles. This means that we vary our choice of vocabulary and grammatical structures depending on the formality or informality of the circumstances. In the same way, we make a series of phonetic adjustments, which include features such as:

- **tempo,** or speed of delivery;
- **rhythm**, or regularity of prominent syllables and words;
- **continuity**, or place and length of pauses;
- **muscular tension**, or articulatory precision
- **weak forms, assimilations, elisions and links.**

ASSIMILATION

Assimilations are changes in pronunciation that take place under certain circumstances at the ends and the beginnings of words (that is, changes at word boundaries), when those words occur in connected speech, or in compounds.

Assimilation is something that varies in extent, according to speaking rate and style; it is more likely to be found in rapid, casual speech than in slow, careful speech. Sometimes the difference caused by assimilation is very noticeable, and sometimes it is very slight. Generally speaking, the most common assimilations occur with consonants, that is, when a word ends in a consonant and is immediately followed by a word that starts with a consonant.

There are two types of assimilations:

a) **regressive** assimilation, which occurs when the following consonant influences the preceding one, for example the word **is** is pronounced [ɪz] and the word **she** is pronounced [ʃiː,ʃɪ]; but when these two words occur together, as in the phrase **is she ?**, they are often pronounced [ɪʒʃiː] rather than [ɪz ʃiː]. The alveolar place of articulation of the sound [z], has changed to a palato-alveolar articulation, under the influence of the following consonant, which is a palato-alveolar fricative sound.

b) **progressive** assimilation, which occurs when the preceding consonant influences the following consonant. This can occur word internally, as for example in the case of the plurals of nouns, the third person singular form of the Simple Present Tense of verbs or the possessive, e.g. **cats** - **dogs; jumps, runs; Pat's - Pam's**. It can also occur at word boundaries, as for example when '**did you'** is pronounced ˈ[dɪdʒuː , dɪdʒə].

Assimilations are not compulsory in many languages, including English: that is to say a speaker may, if he chooses, avoid making them. When they are made, however, they have the effect, whether they are progressive or regressive, of producing some economy of effort in the utterance of a sequence of words. The result of the assimilation is to reduce the number, or the extent, of the movements and adjustments that the speech -producing organs have to perform in the transition from one word to the next.

Assimilations save effort by means of three different sorts of changes in the sequence of speech-producing movements:

a) **Changes involving the state of the vocal folds: assimilation of voice or assimilation of voicelessness.**

Assimilations of voice are common only in Scottish English. For example, in the compound words blackboard and birthday, the words black and birth, which normally end in voiceless consonants, may be pronounced with voiced ones.

Assimilations of voicelessness are common in all types of English. Some examples of regressive assimilations of this type are the phrases: ' **of course '** and ' **have to '** pronounced with the voiceless consonant [f] instead of the voiced [v]; or the compound word '**newspaper'** with the voiceless [s] instead of the voiced [z]. An example of progressive assimilation of this type occurs when the word '**is'** is pronounced [s] in '**what's, it's '**.

b) **Changes involving the position of the soft palate: oral /nasal.**

These assimilations are rare, or non-existent, in English, but they are found in other languages as in Spanish, for example in "**un buen día**", where the vowels [u,e] have a certain degree of nasality in anticipation of the nasal consonant that follows them. In French, for instance, the phrase "**une langue moderne"** may be pronounced [yn lɑ̃ŋ mɔdɛʀn] where /ŋ/ replaces, by a regressive assimilation of nasality the [g] that would be used when the word is said in isolation.

c) Changes involving movement of the articulators: changes in the place of articulation.

This is by far the most frequent type of assimilation in English, and a wide variety of examples can be found. The more familiar and the faster the style of speech, the more frequent such assimilations are likely to be. In the majority of cases they are **regressive**. Some examples are **is she** [ɪʒʃiː]; **ten minutes** [tem mɪnɪts]; **I'm going** [aɪŋ gəʊɪŋ]

The sounds most easily affected by this type of assimilations in English are the **alveolar consonants:** [t-d-s-z-n]. Following the rule, transcribe the phrases below assimilating the alveolar consonants to the place of articulation of the following consonant:

a. [**t, d, n**] become [**p, b, m**] when followed by a bilabial consonant, e.g.

Lend me that pen. [ ];
You'd better do it now! [ ];
He did it on purpose. [ ]

There 're ten men kicking a red ball in the field. [ ];

b. [**t, d**] become [**tʃ, dʒ**] - ***yod coalescence-,*** when followed by [**j**], e.g.

She came last year. [ ];
There's a man behind you. [ ].
He met you last year. [ ];
John, get your sister out of the car! [ ];
I'll let you out, doggie. [ ];
Would you try speaking in Portuguese? [ ];

c. [**s, z**[become [**ʃ, ʒ**] when followed by [**j, ʃ, ʒ, tʃ, dʒ**] e.g.

Her voice shook. [ ];
In case you do it. [ ];
Here's yours. [ ];
He was shot. [ ]
Red roses charm people. [ ];
Is George coming? [ ];
Has Charles arrived? [ ];

d. [**t, d, n**] become [**k, g, ŋ**] when followed by [**k, g, w**], e.g.

Have some hot cakes! [ ];
I should go now. [ ];
He's driving his own car. [ ].
Let Guy do it. [ ];
He got one cake for Alice. [ ];
He told Cathy he had seen Bob. [ ];
Jane bought ten bottles of red wine in this shop last year. [ ];

ELISION

Elision is used to refer to the omission of sounds in connected speech. Both consonants and vowels may be affected, and sometimes even whole syllables may be elided. Unstressed **structural** words, such as **and** and **of** are particularly prone to be elided, as when the **f** is dropped in **cup of tea** (cf. cuppa tea), or the **a** and **d** are dropped in boys 'n girls. Within polysyllabic words, vowels and consonants in unstressed syllables are regularly elided in conversational speech or normal speed, e.g. **camera** /kæmɻ/; **probably** /prɒbblɪ/; **February** /ˈfebrʊrɪ/. Complex consonant clusters are also often reduced, e.g. **twelfths** becoming / twelθs / or / twelfs /.

We can find elisions of two types:

a. Word-internal:

♣**weak, central vowels** /ə, ɪ, ʊ/ are elided when they occur in unaccented syllables between two consonants, specially if the following consonant is /r, n, l/. Examples: **certain** /tn̩\; **importance** /tn̩s/; **student** /dn̩t/, **impatience** /ʃn̩s/, **vision** /ʒn̩/**, classical** /kl̩/, **arrival** /vl/**, nasal** [zl], etc.

* note that schwa [ə] must not be elided when a nasal consonant precedes the sequences [-dən, -tən], e.g. **London, abandon, sentence, Washington.**

♦**alveolar consonants** are elided when they occur between two consonants, e.g. **handsome** /ˈhænsəm/, **postpone** /pəˈspəun/, **asthma** /ˈæsmə/, (notice that this rule has been applied to **asked** /ˈɑst/, even though the consonant in the middle is not an alveolar.

b. At word boundaries:

word-final alveolars [t,d] are generally elided* when they are preceded and followed by other consonants, especially when the **following** consonat is a plosive, e.g. **next turn** /nekst`tɜ:n ~ neks`tɜ:n/; **best joke** [best `dʒəʊk ~ bes`dʒəʊk]; **send two** /send`tu: ~ sen`tu:/ **rubbed down** /rʌbd`daʊn ~ rʌb`daʊn/.

* there is a tendency to retain [t, d] if the following word starts with [h], e.g. **guest house, send home.**
* there is a tendency to retain [t] in the sequences [-nt, -lt], e.g. **sent them, spoilt child.**

♠[h] is elided* in **unaccented, non-initial he, his, her (self), him (self), have, has, had,** and sometimes **who,** e.g. **Give him his pencil.**['gɪv‿ɪm‿ɪz`pensəl]; **George has seen her twice** ['dʒɔ:dʒ‿əz 'si:n‿ɜ:`twaɪs].

* if the preceding word ends in an optional ʔrʔ, only **one** (**[h]** or **[r]**) of them should be elided, e.g. **Peter himself did it.** ['pi:tə‿ɹ‿ɪmself`dɪd‿ɪt ~ 'pi:tə hɪmself`dɪd‿ɪt].

COMPRESSIONS

These occur when:

a. a vowel is reduced to a semivowel, as in the case of **to open** [twəupm̩], in English; and of **agua y aire** [aɣwa jaire] and **como te iba diciendo** ['komo tjiβa ði`sjendo] in Venezuelan Spanish.

b. a diphthong becomes a monothong, e.g. **tomorrow morning** [tə'mɒrə`mɔnɪŋ].

c. word - internally in the following cases:
♦when we pronounce either [ʊ] or [ə] instead of the diphthong [ʊə], in words like ac**tua**lly, u**sua**lly, va**lua**ble;
♣when we pronounce [ə] instead of the diphthong [əʊ], in words like: auto**mo**bile, ex**tro**vert, **mo**bility, **No**vember, **o**mission, **ro**mantic, **vo**cation.
♠when we pronounce [jə] instead of [ɪə], and [wə] instead of [ʊə], in words like en**vious**, bri**lliant**, in**fluence**, an**nual**.

Practice with the following examples in informal colloquial style:

1. **How do you do!** ['haʊ dju: `du:]
2. **I'm gonna buy it.** [ɑ: gənə `bɑ: ɪt]
3. **Right you are!** [raɪtʃu:`ɑ:]
4. **I don't know why.** [aɪ dənə`waɪ]
5. **What did he do?** ['wɒ dɪdɪ`du:]
6. **I'm glad.** [aɪŋ`glæd]
7. **I should think so.** [aɪ ʃ`θɪŋk səʊ]
8. **How are you folks?** ['haʊ jə`fəʊks]
9. **It happened once.** [ɪt 'hæpm̩`wʌns]
10. **Do you want one?** [dju: ˌwɒmp wʌn]
11. **They haven't been.** [ðə 'hæbm`bɪn]
12. **I didn't want to.** [ɑ: dɪbm`wɒn tu:]

STYLES OF PRONUNCIATION

First of all let's review the terms **dialect, idiolect** and **register** (DIALECT & RELATED TERMS handout)

Although from the phonetician's point of view it is difficult to draw a precise dividing line between the different styles of pronunciation, we will adopt the styles presented by Finch and Ortiz (1982:82):

1.- Formal which is characterized by slow tempo, precise articulation, and high frequency of accented words. It is used in formal recitations, church services, etc. Foreign learners should not use this style of pronunciation for normal, everyday use.

2.- Unhurried Colloquial It is the slower of the conversational styles. It uses a high frequency of accented words, a minimal number of contextual assimilations and elisions and precise articulation.

3.- Informal Colloquial. It is the most informal of the conversational styles. It is faster, uses a maximum number of assimilations, elisions and compressions; lax, slurred articulation and a reduction of accented words.

We can put the two conversational styles on a scale, with the Unhurried Colloquial at the formal end and the Informal Colloquial at he informal end. Nevertheless, there is an infinite number of styles in between, depending on the situation, the topic, the backgrounds of speaker and listener, and the relationship between them.

To play safe, you as a foreign learner should adopt, for production, the Unhurried Colloquial style, as long as you are exposed to the Informal Colloquial in the advanced stages, so as to become a "passive" user of it, in order to understand it with ease.

On the production side, once you have mastered the pronunciation of the **citation forms** (those appearing in pronouncing dictionaries) and acquired an easy command of spoken English, you can start dealing with problems of linking words together. The better you become in the use of the language, the easier it will be to use the features of connected speech. You should aim at the systematic and consistent use of the more common elisions and assimilations.

In order to develop your "receptive fluency" you will require a theoretical description of the Informal Colloquial style and systematic exposure to spontaneous, informal, conversational English. This will enable you to gradually understand a message from very informal conversational styles.

GLOSSARY OF TERMS

CONNECTED SPEECH A term used in linguistics to refer to spoken language when analyzed as a continuous sequence, as in normal utterances and conversations.

UTTERANCE What is said by any one person before or after another person begins to speak. For example, an utterance may consist of one word, one phrase, one sentence, or of more than one sentence.

PROMINENCE A term used in Auditory Phonetics to refer to the degree to which a sound or syllable **stands out** from others in its environment. The following factors are important to make a syllable prominent: **differences in quality, length (quantity), pitch and stress.**

QUALITY A term used in Auditory Phonetics and Phonology to refer to the characteristic **resonance**, or **timbre,** of a sound which is the result of the range of frequencies constituting the sound's identity. Articulatorily, those frequencies are caused by the vibration of the vocal folds and modified by the resonators as the air passes through them. Therefore, we can say that articulatorily, quality depends on the shape of the resonators. Variations in both **vowels** and **consonants** are describable in terms of quality, e.g. the distinction between /i/ and /e/.

QUANTITY Auditorily, it is that property of a sound that enables us, using only our ears, to place a sound on a **scale going from short to long.** From the **perceptual** point of view, it is referred to as **length.**

PITCH Articulatory, pitch is caused by the **frequency** of vibration of the vocal folds; the tenser they are the faster they vibrate, and the higher (acute) the note. **Auditorily,** it is that quality of a sound, in terms of which, it can be placed on a **scale running from high to low, or acute to grave.**

STRESS Articulatorily, stress in caused by greater muscular energy and breath force. **Auditorily**, it is perceived as **loudness.** So we van say that it is that quality of a sound that enables us, using only our ears, to place it on a **scale from loud to soft.**

There are three levels of stress:

a) **strong or primary,** e.g. a ˈ**round.**
b). **secondary,** e.g. ˌ**pho**to ˈgraphic.
c. **unstressed,** e.g. **a** ˈround.

COMPLEX WORDS are of two major types:

1. **AFFIX** words, made from a basic **stem or base form** with the addition of an **affix.**
Affixes can be of two sorts in English:

- **prefixes,** which come before the stem, e.g. **un** + happy and
- **suffixes,** which come after the stem, e.g. happi + **ness.**

2. **COMPOUND** words, which are made of two (or occasionally more) independent English words, e.g. loud/speaker, second-class.

CONTENT (FULL, LEXICAL) WORDS. These are words that refer to a thing, quality, state, or action and which have meaning (lexical meaning) when the words are used alone. **Content words are mainly nouns, verbs, adjectives and adverbs.**

FUNCTION (FORM, EMPTY, GRAMMATICAL, STRUCTURAL, STRUCTURE) WORDS These are words that have little meaning on their own, that is, when standing in isolation, but which show grammatical relationships **in** and **between** sentences. **Conjunctions, prepositions, articles, auxiliary verbs (including modals), pronouns,** are function words.

4. THE ENGLISH VOWELS

4.1 English Pure Vowels (Monophthongs)

Vowels are produced with the vocal tract open. For that reason, they are said to be articulated with an **open articulation**, in opposition to consonants. We know that in the production of a sound, several elements participate: vibration and resonance. In the case of English vowels, they are all produced with vibration of the vocal folds, so they are **voiced sounds**. The escape of the airflow coming from the lungs is always made through the mouth only, because the soft palate is in its raised position, that means they are **oral sounds**. More has to be said about the resonance effect produced by the position of the articulators in the oral cavity, mainly. In this respect, the only possible articulation is that of the tongue position, being more or less raised, more or less advanced, because the mouth will be open, as we have just stated. Two parameters are then firstly considered: **height of the tongue** and **backness of the tongue**. One more parameter has to do with the position of the lips, which are considered as another **resonator**. So, the **rounding of the lips** is also considered to describe how a vowel is produced.

According to the height of the tongue, vowels can be **high**, **mid** or **low**. According to the backness of the tongue, vowels can be **front**, **central** or **back**. According to the **rounding of the lips** vowels can be **spread**, **rounded** or **neutral**.

In the picture below we can see the position of the tongue for the production of two different vowels in English: /i:/ and /ɑ:/. The black dot means the highest point of the tongue and it determines the articulation for that vowel. So, in the first case, we can clearly see that it is the front of the tongue being raised which produces the sound, whereas, in the second case, it is the back of the tongue in its lowered position which produces the vowel.

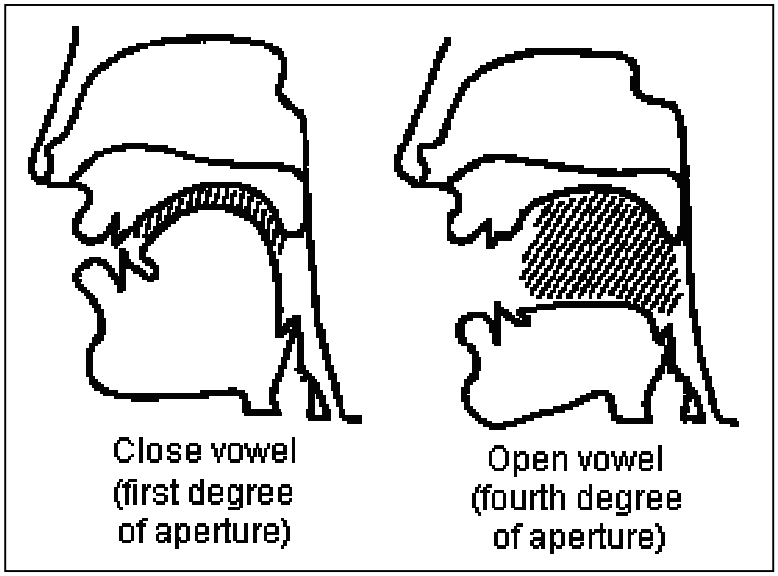


Figure no. 1: Sagittal section for a close vowel and an open vowel

As we can infer from the picture, vowels can be pronounced with a more or less degree of aperture, going from completely closed (as in the case of /i:/) or completely open (for /ɑ:/) in English. The articulation is done with a more or less openness of the mouth, which, in fact refers to a more or less elevated tongue (as we can also infer from the picture).

These diagrams are called **sagittal sections** and are very useful to see how vowels are pronounced. If we consider the different heights that the tongue can adopt in English, and imagine a maximum point of elevation, we can define the different types of vowels that exist in this language. Here we have a picture that shows the different elevations of the tongue.

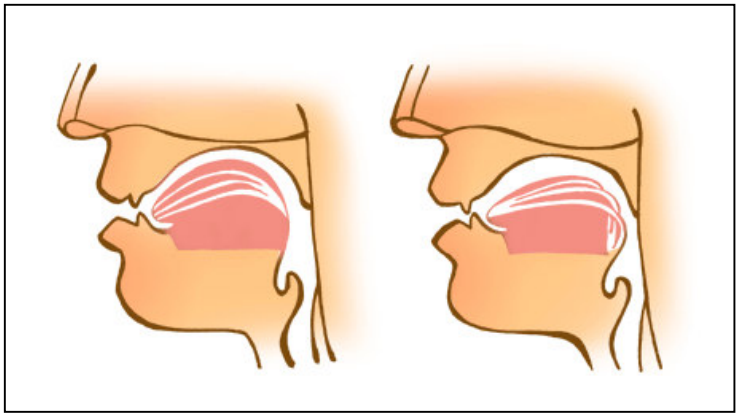


Figure no. 2: Different height for the tongue

If we pay attention to the picture, we will see that the elevation can be of the front part of the tongue or of the back part of the tongue. To be precise, that elevation can be of the following parts of the tongue:

a) Front
b) Centre
c) Back

According to which part is more elevated, we will have:

a) **Front vowels**
b) **Central vowels**
c) **Back vowels**

The elevation, as we see, can be low, mid or high. That elevation will result in a more or less openness of the mouth, too. According to the degree of elevation of the tongue, vowels can be:

a) **High vowels**
b) **Mid vowels**
c) **Low vowels**

If, instead of the height, we consider the openness of the mouth, the same vowels can be termed as being:

a) **Close vowels**
b) **Half-close vowels / Half-open vowels**
c) **Open vowels**

Close here means approximation. We must remember that all vowels are produced with open articulation.

We can see all vowels incorporated into one single diagram that shows the imaginary high points of the elevation of the tongue:

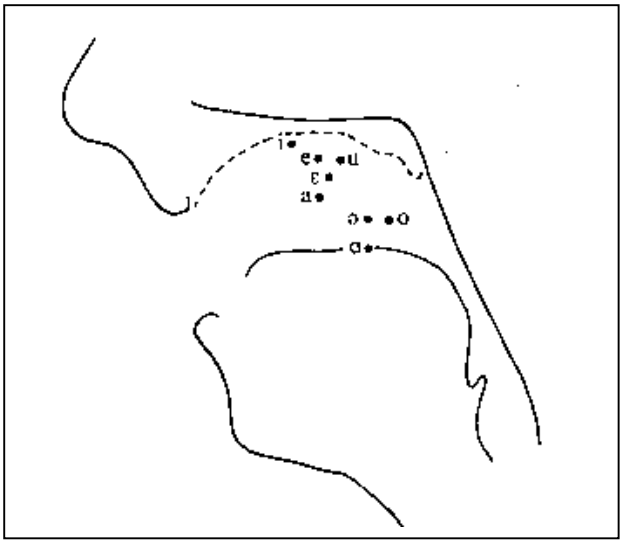


Figure no. 3: different (imaginary) positions for the tongue for English vowels

The picture shows only several English vowels. There are more, as we will see. However, this picture can serve us to understand the vowel chart (or diagram) which is normally used by phoneticians to represent vowels. This vowel chart is intended to represent the oral space, and every dot represents the height of the tongue. If the dot appears at the front area, then the highest point of the tongue is in the front of the tongue, if the dot is shown in the central area, then we are referring to a central tongue, etc. Below we can see this general vowel chart which is called **cardinal vowel scale**. The reason it is considered "cardinal" (and, therefore, general) is that it represents general parameters which every specific language can take as a point of reference to represent specific vowel sounds.

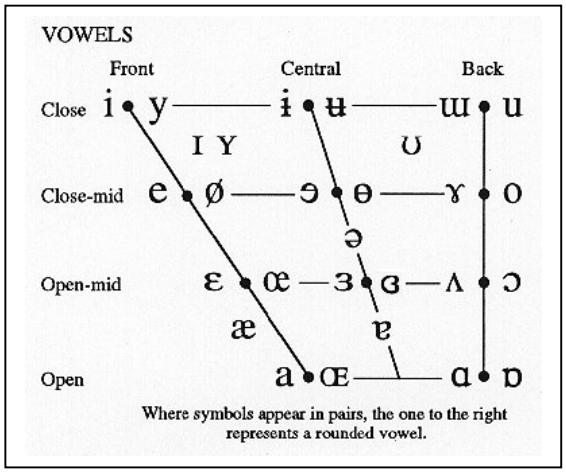


Figure no.4: The Cardinal Vowel Scale

The representation of the vowel in this scale follows specific parameters, as we can infer from the following picture.

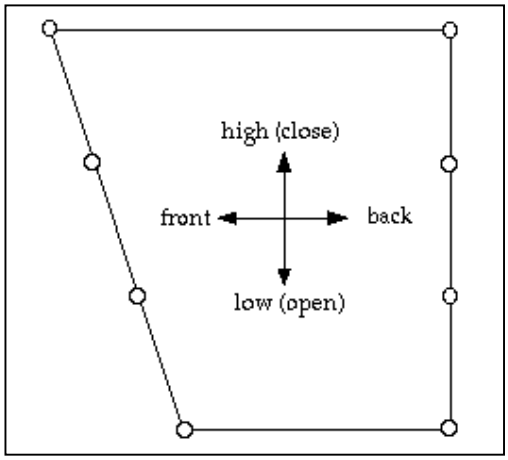


Figure no. 5: Organization of the vowels in the vowel scale

That is, as we were saying before: front vowels will be situated at the left of the diagram, high vowels at the top, etc. Vowels can then be more or less high, more or less front/back, and that degree of aperture/height can be easily represented in the vowel scale.

Below we have a vowel scale that includes all English vowels, with examples:

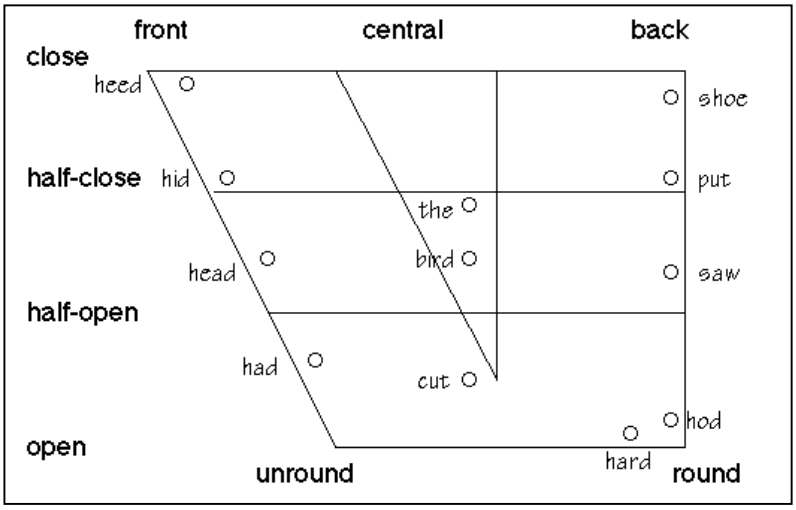


Figure no. 6: British English vowels

The vowels represented are from British English. The scale also shows how front vowels tend to be unround while back vowels are usually rounded. As far as the position of the lips (the fourth resonator), vowels can be defined as being:

a) **Neutral**
b) **Spread**
c) **Round**

The following picture shows the different positions of the lips:

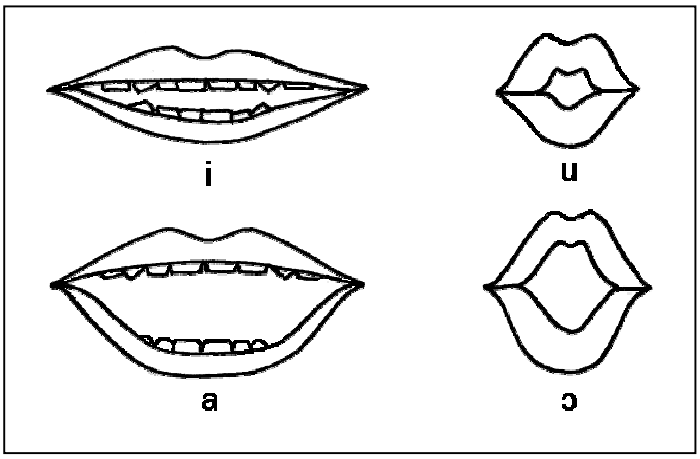
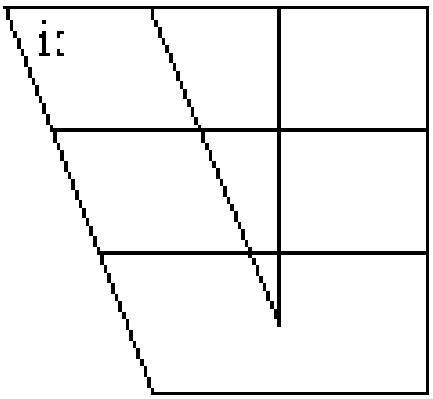


Figure no. 7: Lip posture

Below you will find a table that summarizes the **articulatory description** of English vowels:

i:

as in *beat, receive, see, unique*

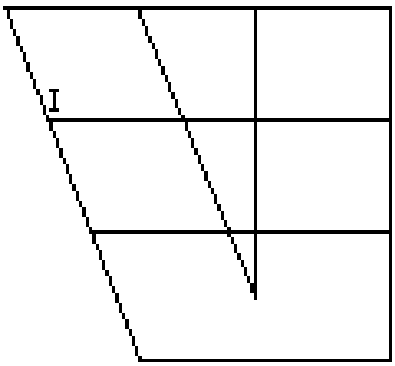


Examples:

- -ee- in see
- -ea- in eat
- -ie- in yield
- -ei- in seize
- -e- in scene
- -i- in police
- -eo- in people
- -ey- in key
- -ay- in quay

Being a long vowel, it almost sounds like a diphthong in RP. It is long enough to be one, but it does not actually glide into another vowel sound. The lips are only slightly spread.

ɪ



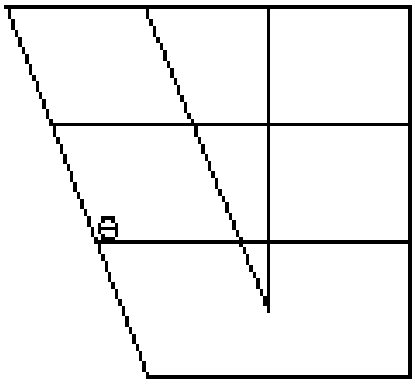
As in wit, mystic, thick, finish.

Spelt as:

- -i- in fifth, rich, with, sit (61%)
- -y- in city, rhythm, symbol (21%)
- -e- in wicket, pretty, wicked (16%)
- -ie- in ladies, sieve
- -a- in village, private
- -o- in women
- -u- in busy
- -ay- in Monday, Sunday
- -ai- in fountain

When you say this vowel sound, the front of the tongue is raised towards the palate. In fact, the position of the whole tongue is relatively high in the mouth, making it a closed vowel. The lips are slightly spread.

e



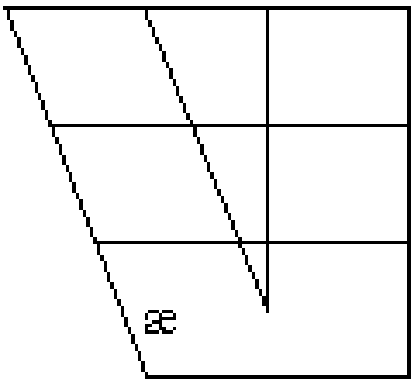
as in fell, set, many, meant.

Can occur as :

- -e- in egg
- -a- in any
- -eo- leopard
- -ea- in realm
- -ei- in leisure

The front of the tongue is used in the production of this vowel, making it a front vowel. It is also a close/middle vowel in that the position of the tongue and jaw is slightly raised. The lips are slightly spread.

æ



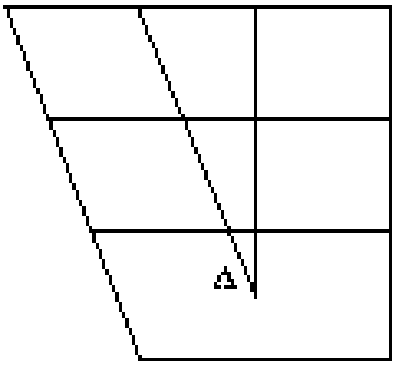
as in hat, man, cash, cap.

In conventional spelling, this sound is spelt with an 'a' 99% of the time. Alternatively, it can be spelt with an 'ai' as in plait or plaid.

This vowel is a front vowel since the front part of the tongue is raised when it is articulated. It is also an open (low) vowel. This means that the tongue is in a low position with the jaw also being lowered. The lips are slightly spread.

This traditionally short vowel has become slightly longer than the other short vowels. This lengthening is apparent before voiced consonants such as in cab, bad, badge and man.

ʌ



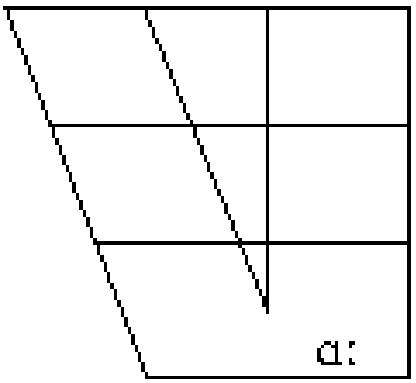
as in cut, bus, come, rough.

Can occur as:

- -o- in come
- -oo- in flood
- -u- in sun
- -ou- in trough
- -oe- in does

This is a central vowel, and one which is more open than mid-ranged. The lip position is a neutral one.

ɑː



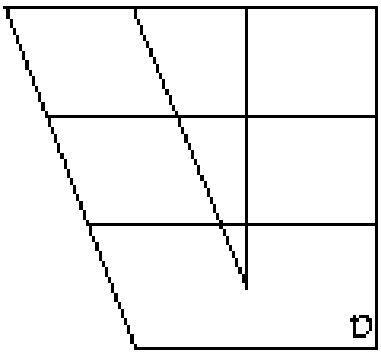
as in cart, half, pass, laugh.

Can occur as:

- -a- in pass
- -ar- in art
- -au- in aunt
- -er- in clerk
- -ear- in hearth
- -al- in calm

This is an open vowel. The lip position is neutral

ɒ

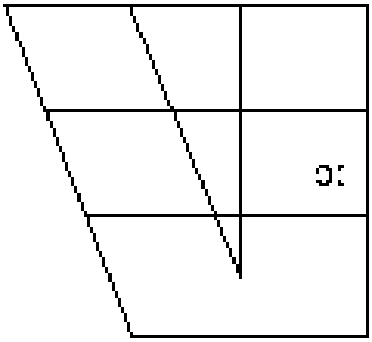


as in cot, what, cost, mop.
Can occur as:

- -o- in sorry
- -au- in because
- -a- in what
- -ou- in cough
- -ow- in knowledge

The tongue and jaw are lowered as the back of the tongue is used to articulate this vowel. Hence it is a back, open (low) vowel. The lips are slightly rounded.

ɔː



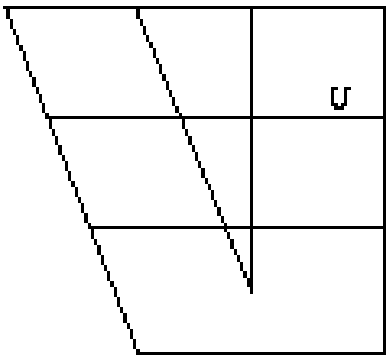
as in caught, port, talk, thought.

Can occur as:

- -aw- in law
- -ou- in bought
- -au- in taught
- -a- in all
- -or- in horse
- -oor- in door
- -oar- in hoarse
- -our- on pour
- -oa- in broad

The vowel is pronounced with rounded position for the lips. It is the back part of the tongue that rises to a low position.

ʊ

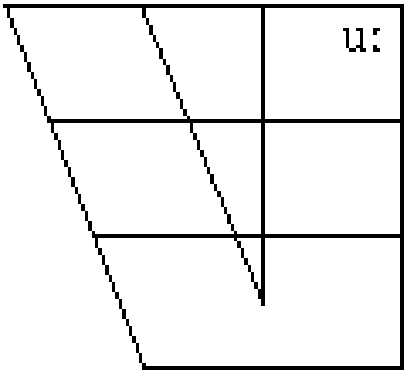


as in book, wood, could, put.

Can occur as:

- /o/ in woman
- /oo/ in good
- /u/ in full
- /ou/ in could

The tongue and jaw are raised as the back of the tongue is used to articulate this vowel. Hence it is a back, close (high) vowel. The lips are rounded.

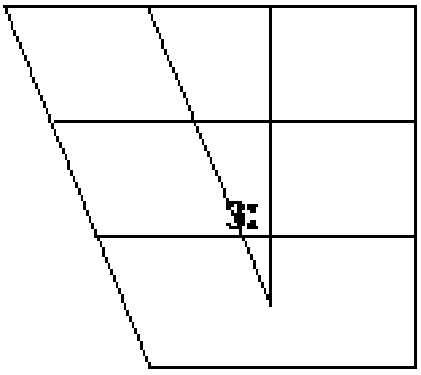


As in spoon, you, blue, balloon.

Can occur as:

- -o- in who
- -oo- in fool
- -u- in rude
- -ou- in soup
- -ew- in few
- -ue- in blue
- -eu- in feudal
- -oe- in shoe
- -ui- in fruit

This vowel is towards the back and is a close sound. The lips are rounded.

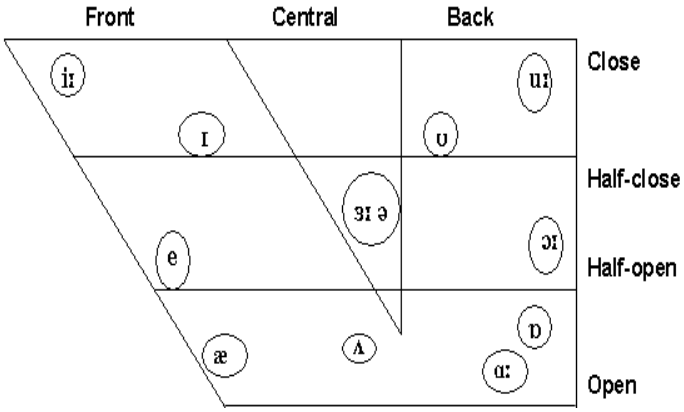


as in hurt, bird, hearse, word.

Can occur as:

- w + -or- as in word
- -our- in scourge
- -ir- in bird
- -yr- in myrtle
- -er- in serve
- -ur- in fur
- -ear- in earth

This is a central vowel. It is commonly used by English speakers as a hesitation sound (spelt 'er'). The lip position is neutral.



as in another, brother, the, postman.

The schwa is an unstressed central vowel and is the most common vowel to appear in English. It is one of the problems of English teaching that the most common vowel has no regular character to represent it.

4.2 Glides, moving vowels (diphthongs and triphthongs)

We entitled the previous section with the term "pure vowels". But what does "pure vowel" mean? Well, maybe we can understand better if we see what the opposite of a pure vowel is. The **open articulation** kind has one special characteristic: the sound can be held as long as there is airflow coming out of the lungs. But that does not mean that the vocal cavity must remain still while the sound is being produced. Keeping the articulation wide open, we can slightly alter the position of the tongue and then modify the quality of the sound that is being pronounced. When we keep the articulators still while the air is going out through the open mouth, we say that we are producing a **pure vowel**. Pure here means that there is no alteration of the lingual position. On the contrary, if we slightly change the position of the tongue while the vowel is being produced, we speak of a **gliding vowel**, or, simply, a **glide**.

Other terms are **monophthongs** for pure vowels and **diphthongs, triphthongs** for moving vowels.

In short, glides are **moving vowels**. They really imply the tongue moving from one vowel position to another vowel position. That movement has to be done quickly: the tongue adopts one position that quickly shifts into a different and steadier position. So, in the production of a glide there are two stages:

a) First, the tongue adopts a **starting position** that remains for a **short period of time**
b) Then, the tongue adopts a **final position** that remains **longer** than the first one

There are two glides in English, and they combine with different vowels:

/j/ and /w/

/j/ *yell, yawn, you*
/w/ *what, we, why, wet, would, wit, wand*

4.3 Diphthongs and Triphthongs

Diphthongs and **Triphthongs** are also other types of vocalic sounds. They are very similar to glides in the sense that they also **imply the movement from one vowel position to another vowel position**. In opposition to glides, diphthongs and triphthongs imply a **starting position** that lasts longer than the following positions.

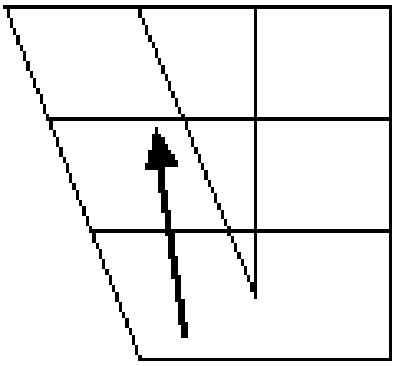
Diphthongs:
For many authors, a diphthong is merely the combination of a vowel plus a glide /j/ or /w/. For other authors, two clearly distinguishable vowels participate. In our case, we will stay with the second opinion and will classify diphthongs according to the following parameters:

a) **Closing diphthongs** are those diphthongs whose final position is that of a **close vowel**, we can say that the tongue moves from a more open to a less open/close position: /aɪ/, /eɪ/, /ɔɪ/, /aʊ/, /əʊ/.
b) **Centering diphthongs** are those diphthongs whose final position is that of a **central vowel**; that is, the part of the tongue that moves from the front/back to the center: /eə/, /ʊə/, /ɪə/.

Pure vowels can be easily represented using a **sagittal section** diagram. The **Cardinal Vowel Scale** is also very productive for the same task. However, glides, diphthongs and triphthongs are not easily represented on such a graph, as they imply movement. For that reason, arrows are used on the original vowel scale to show that motion.

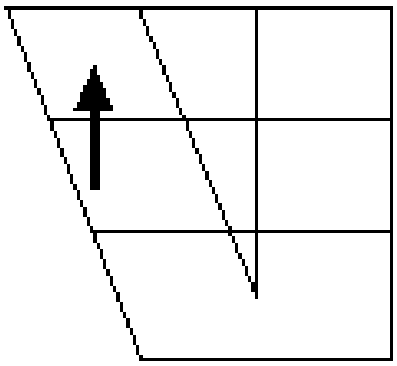
aɪ

as in buy, fine, sight, file.



This diphthong begins with an open vowel which is between the front and back position. It is quite similar to the vowel sound found in 'cut' and 'sun'.

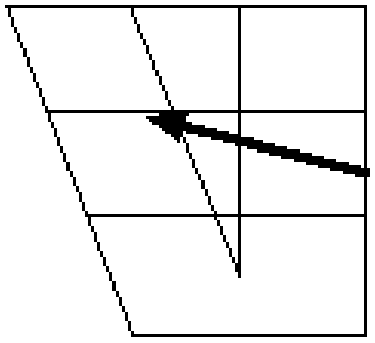
eɪ



as in late, day, vein, fail.

This diphthong begins with the same /e/ as in 'get' and 'men'. The sound then glides from a relatively more open to a more closed vowel position.

ɔɪ

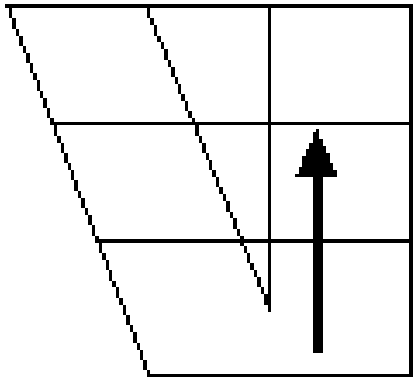


as in boy, join, voice, foil.

The first part of this diphthong is the vowel sound found in 'caught' and 'born' before gliding to the front, close position

ɑʊ

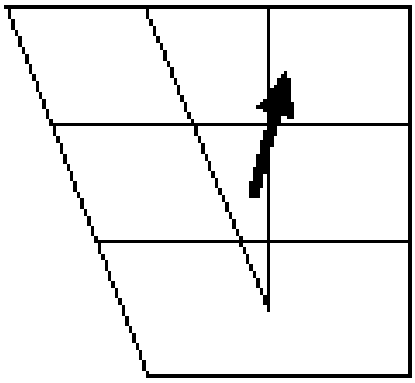
as in boy, join, voice, foil.



The first part of this diphthong is the vowel sound found in 'caught' and 'born' before gliding to the front, close position.

əʊ

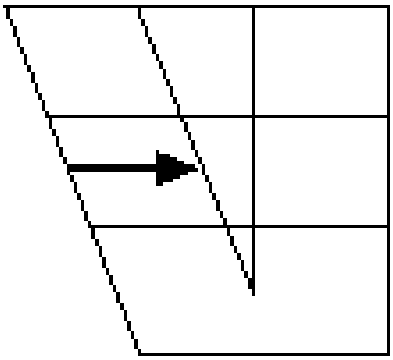
as in slow, go, dough, coat.



This diphthong starts in the central schwa position. The sound then glides to the back, close position of the vowel sound found in 'put' and 'pull'.

eə

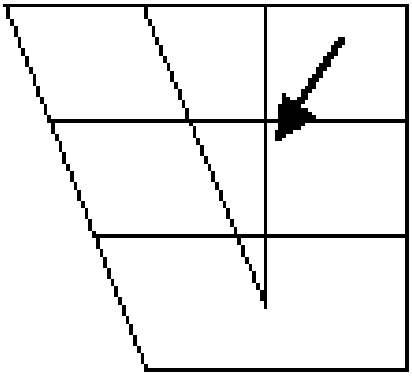
as in share, care, fair, bear.



This vowel starts with the vowel found in 'get' and 'beg' before gliding to the central schwa position.

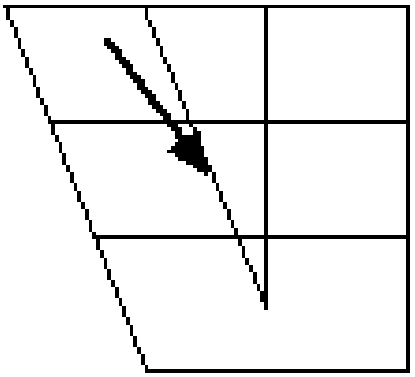
ʊə

as in sure, endure, lure, pure



This diphthong starts in a slightly closer position than the vowel in 'put' and 'push' before gliding towards the central schwa position.

ʊə



as in sure, endure, lure, pure

This diphthong starts in a slightly closer position than the vowel in 'put' and 'push' before gliding towards the central schwa position.

Triphthongs:
Triphthongs imply the combination of **three different positions of the tongue** in the production of a vowel. Triphthongs in English are always the result of the combination of a **closing diphthong plus a schwa**.

leɪə layer

laɪə liar

lɔɪəl loyal

paʊə power

məʊə mower

Part B: stress in words and phrases

This part of the book deals with the **marking of stress** in words and phrases. It begins with an introductory case study, focussing on one very specific use of stress patterns in words, before going on to look at the full range of stress patterns and marking. Stress is discussed in LPD in the Introduction 3:3, and the note STRESS.

8 Pairs of words with different stress

 A number of English words have the same spelling for a noun or adjective and a verb. There is a group of these two-syllable words where the noun/adjective is stressed on the first syllable, and the verb on the second.

e.g. a **record** ˈre kɔːd to **record** rɪ ˈkɔːd
perfect ˈpəːf ɪkt to **perfect** pəː ˈfekt

EXERCISE 39

AIM: To stress nouns and verbs correctly.

 Fill the gaps in the sentences below. The words you need are listed under the sentences. Mark the stressed syllable of each word.

1. There has been a big ..ˈincrease.. in the number of students applying to this college.
2. As a Red-Cross volunteer, she sometimes has to ..... disabled people travelling across London.
3. A recent ..... showed that 98% of households have colour television.
4. The council are going to ..... the High Street into a pedestrian shopping centre.
5. The winning song in the Eurovision Song ..... is usually pretty dull.
6. A gesture which is friendly in one country may be a deadly ..... in another country.

contest convert escort increase insult survey

EXERCISE 40

AIM: A. To use the dictionary to check stress patterns.

B. To stress nouns and verbs correctly.

KEY a. The words below can all be a noun and a verb. For some of them the noun and verb have different stress (like 'record'). For others, the noun and verb have the same stress. Underline the words which you think have different stress for the noun and verb. Use the dictionary to check your choice.

answer contrast offer present reject reply transport

b. Use each underlined word in two sentences, once as a noun and once as a verb. Make sure you say the words with the correct stress.

Vowels in unstressed syllables

In some Noun-Verb pairs, the vowel in the first syllable is different in the noun and the verb.

e.g. 'reˌkɔːd rɪ'kɔːd

In other pairs, the vowel is the same. e.g. 'ɪnˌsʌlt ɪn'sʌlt

EXERCISE 41

AIM: To use the dictionary to check pronunciation.

Use the dictionary to check the vowel in the first syllable of the words underlined below. Write the word and mark the stressed syllable.

1a. There has been a <u>decrease</u> in the birth rate. ..'diː kriːs.....

1b. The number of members is expected to <u>decrease</u>. .....

2a. His business interests <u>conflict</u> with his public duty. .....

2b. The border dispute may lead to armed <u>conflict</u> between the two countries. .....

3a. The President had an armed <u>escort</u>. .....

3b. The receptionist will <u>escort</u> visitors to the meeting room. .....

4a. Taxes are not expected to <u>increase</u>. .....

4b. The average <u>increase</u> in earnings last year was 6%. .....

5a. I cannot <u>permit</u> such behaviour. .....

5b. Have you got a <u>permit</u> for that gun? .....

6a. I'm going to <u>protest</u>. .....

6b. There will be a storm of <u>protest</u>. .....

7a. The <u>rebels</u> in the hiils will never surrender. .....

7b. Every child <u>rebels</u> against authority at some stage. .....

EXERCISE 42

AIM: Further practice with stress and pronunciation in pairs of words.

Can you solve the following clues? In each pair of clues, the words referred to have the same spelling, but different stress. Write the spelling, and the pronunciation corresponding to each meaning. The first one is done for you.

1. give sympathy and comfort
   a keyboard, panel of switches
   console
   kən 'səʊl
   'kɒn səʊl
2. decline to do something
   rubbish
3. get smaller
   a formal legal agreement
4. happy, satisfied
   what is contained in something
5. pull out
   a short passage from a longer text
6. disagree, protest
   a thing
7. very small
   sixty seconds
8. go away from, leave
   a place where nothing grows

KEY If you are stuck, choose from the words in Key A. The full answers are given in Key B.

Stress on the first syllable of nouns

This is a productive pattern, and frequently appears in new words, particularly those formed from phrasal verbs, e.g. 'ɪn pʊt 'teɪk ɒf

EXERCISE 43

AIM: To practise stress on the first syllable of nouns.

KEY Can you identify the nouns defined below? They are all related to phrasal verbs. When you say the nouns, make sure the first syllable is

stressed.
1.an armed bank raid ..a hold-up...
2.a burglary .....
3.an appearance by a star who had retired .....
4.a sudden strike .....
5.a cinematic device where the film switches to an earlier period .....
6.a sudden period of heavy rain .....
7.a mechanical (and, metaphorically, other) failure .....
8.a ten second period immediately before the departure of a rocket .....
9.the moment of departure of a rocket .....
10. (initial) expenditure on a particular project .....

If you are stuck, choose from the nouns listed below.

breakdown break-in comeback countdown downpour flashback hold-up lift-off outlay walkout

9 Stress marking

The stresses marked in the dictionary are lexical (= underlying = potential) stresses; the marking shows how the word is stressed when it is spoken in isolation, and which syllables can be accented in connected speech.

EXERCISE 44

AIM: To recognise the stressed syllable when you hear a word. To use the primary stress mark ' correctly in a word with one stressed syllable.

  The extract below comes from *Down and Out in Paris and London* by George Orwell. Orwell is describing his experience as a tramp in London in the 1930's. Listen to the extract on the cassette. Mark the stressed syllable in the words underlined. The first two are done for you.

I stayed in the streets till late at night, 'keeping on the move all the time. Dressed as I was, I was half a'fraid that the police might arrest me as a vagabond, and I dared not speak to anyone, imagining that they must notice a disparity between my accent and my clothes. (Later I discovered that this never happened.) My new clothes had put me instantly into a new world. Everyone's demeanour seemed to have

changed abruptly. I helped a hawker pick up a barrow that he had upset. “Thanks, mate,” he said with a grin. No one had called me mate before in my life – it was the clothes that had done it. For the first time I noticed, too, how the attitude of women varies with a man's clothes. When a badly dressed man passes them they shudder away from him with a quite frank movement of disgust, as though he were a dead cat. Clothes are powerful things. Dressed in a tramp's clothes it is very difficult, at any rate for the first day, not to feel that you are genuinely degraded. You might feel the same shame, irrational but very real, your first night in prison.

EXERCISE 45

AIM: To use the primary stress mark ˈ correctly in a word with one stressed syllable.

KEY Each of these definitions refers to a word in the dictionary extract below and on the next page. Find the appropriate word, and write its transcription, with the stress marked. The first one is done for you.

1. a business that makes its money esp. by bringing people into touch with others or the products of others ..ˈeɪʤ ənsi.....
2. a list of subjects to be dealt with or talked about at a meeting .....
3. to make (a difficult situation) more serious or dangerous; make worse .....
4. a person whose job is to represent another person, a company, etc. esp. one who brings people into touch with others or deals with the business affairs of a person or company .....
5. *derog* always ready to quarrel or attack .....
6. *BrE sl* trouble, esp. fighting, eg between groups of young people .....
7. an ..... language: one in which words are formed by agglutination
8. able to move quickly and easily .....
9. *noun usu.* derog increase in size, power or rank, esp. when intentionally planned .....

agenc|y ˈeɪʤ ənsi **~ies** iz

agenda əˈʤend ə **~s** z

agene ˈeɪʤ iːn

agent ˈeɪʤ ənt **~s** s —*see also phrases with this word*

agent provocateur ˌæʒ ɒ̃ prə◦vɒk əˈtɜː ˌeɪʤ ənt– ‖ ˌɑːʒ ɑ̃ː proʊ ˌvɑːk ə

ˈtɝːɪ −ˈtʊəʳ

−*Fr* [a ʒã pʁɔ vɔ ka tœːʁ] **agents provocateur** *same pronunciation, or* -z

agentive ˈeɪdʒ ənt ɪv

age-old ˌeɪdʒ ˈəʊld ◄ →−ˈɒʊld ‖ −ˈoʊld ◄

-ageous ˈeidjəs —*This suffix may impose rhythmic stress on the preceding stem*

(ˌadvanˈtageous).

ageratum ˌædʒ ə ˈreɪt əm −ˈreɪt̬− **~s** z

Agfa *tdmk* ˈæg fə

Agg æg

Aggett ˈæg ɪt −ət

Aggie ˈæg ɪ

aggiornamento ə ˌdʒɔːn ə ˈment əʊ ˌæ− ‖ ə ˌdʒɔːrn ə ˈment oʊ − *It* [ad ˈdʒor na ˈmen to]

agglome|rate *v* ə ˈglom ə |reɪt ‖ ə ˈglɑːm− **~rated** reɪt ɪd −əd ‖ reɪt̬ əd **~rates** reɪts **~rating** reɪt ɪŋ ‖ reɪt̬ ɪŋ

agglomerate *adj, n* ə ˌglɒm ər ət −ɪt, −ə reɪt ‖ ə ˌglɑːm− **~s** s

agglomeration ə ˌglɒm ə ˈreɪʃ ən ‖ ə ˌglɑːm− **~s** z

aggluti|nate *v* ə ˈgluːt ɪ |neɪt −ə− ‖ −ən |eɪt **~nated** neɪt ɪd −əd ‖ neɪt̬ əd **~nates** neɪts **~nating** neɪt ɪŋ ‖ neɪt̬ ɪŋ

agglutinate *adj, n* ə ˈgluːt ɪn ət −ən−, −ɪt; −ɪ neɪt, −ə− ‖ −ən− **~s** s

agglutination ə ˌgluːt ɪ ˈneɪʃ ən −ə− ‖ −ən ˈeɪʃ−

agglutinative ə ˈgluːt ɪn ət ɪv ·ˈ·ən−; −ɪ neɪt−, −ə neɪt−, −ən eɪt− | −ən eɪt̬ ɪv −ən əţ ɪv **~ly** li

aggrandis… —*see* **aggrandiz**…

aggrandiz|e ə ˈgrænd aɪz ˈæg rən daɪz **~ed** d **~es** ɪz əz **~ing** ɪŋ

aggrandizement ə ˈgrænd ɪz mənt −əz−, −aɪz−

aggra|vate ˈæg rə |veɪt **~vated** veɪt ɪd −əd ‖ veɪt̬ əd **~vates** veɪts **~vating/ly** veɪt ɪŋ /li ‖ veɪt̬ ɪŋ /li

aggravation ˌæg rə ˈveɪʃ ən **~s** z

aggregate *adj, n* ˈæg rɪg ət −rəg−, ɪt; −rɪ geɪt, −rə− **~s** s

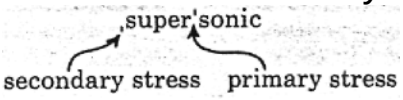
aggre|gate *v* ˈæg rɪ |geɪt −rə− **~gated** geɪt ɪd −əd ‖ geɪt̬ əd **~gates** geɪts **~gating** geɪt ɪŋ ‖ geɪt̬ ɪŋ

aggregation ˌæg rɪ ˈgeɪʃ ən −rə− **~s** z

aggression ə 'greʃ ᵊn
aggressive ə 'gres ɪv **~ly** li **~ness** nəs nɪs
aggressor ə 'gres ə || -ᵊr **~s** z
aggrieved ə 'griːvd
aggro 'æg rəʊ || -roʊ
Agha- *comb. form in Irish place names* 'ˌæx ə —**Aghacully** ˌæx ə 'kʌl i
aghast ə 'gɑːst -'gæst || ə 'gæst
agile 'ædʒaɪᵊl || -ᵊl -aɪᵊl *(not ·'·)* **~ly** li **~ness** nəs nɪs

Secondary + primary stress

When the primary stress in longer words occurs late in the word, there is a secondary stress on the first or second syllable.



EXERCISE 46

AIM: To recognise secondary and primary stress when you hear a word. To mark secondary and primary stress.

KEY Listen to these words on the cassette. Mark the secondary and primary stress, as in the example on page 43.

1. anniversary
2. definition
3. epicurean
4. mediocrity
5. metaphysical
6. mortification
7. proclamation
8. regeneration
9. valediction

Use the words above to fill the gaps below. Say the titles.

The ..... Poets
A selection of poems

..... in love rejected	Thomas Carew
A .....: forbidding mourning	John Donne
The	John Donne
An Ode upon his Majestie's	Sir Richard Fanshawe
An ..... Ode	John Hail
.....	George Herbert
The ..... of Love	Ancirew Marvell
.....	Henry Vaughan

EXERCISE 47

AIM: To mark secondary and primary stress.

The following words each have two stressed syllables, with the later stressed syllable carrying the primary stress. Mark the two stressed syllables. You can look the words up in the dictionary to check. The first one is done for you.

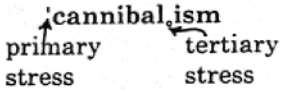
1. ˌsabba'tarian
2. sacramental
3. sacrificial
4. sacrilegious
5. Sagittarius
6. Salamanca
7. Salieri
8. salmonella

Some words have a secondary stress marked in brackets e.g. (ˌ)San 'Remo
This means that some speakers put a secondary stress on the first syllable:

ˌSan 'Remo and others do not stress it: San 'Remo

Tertiary stress - after primary stress

In multi-syllabic words, there is sometimes a rhythmic beat on a syllable after the primary stress. This syllable is not usually accented when the word is in a sentence. It is marked ◦ and referred to as tertiary stress.



EXERCISE 48

AIM: To recognise tertiary stress after the primary stress when you hear a word. To mark primary and tertiary stress.

KEY Listen to the following words and phrases on the cassette. Each has two stressed syllables, with the earlier stressed syllable carrying the primary stress. Mark the stressed syllables, as in the example on page 45. The first one is done for you.

1. 'rain◦forest
2. octosyllable
3. revisionism
4. caretaker
5. castaway
6. undercarriage
7. upbringing
8. obstructionism
9. officeholder
10. estate agent
11. record library
12. Oedipus complex
13. uncertainty principle

EXERCISE 49

AIM: To distinguish between: primary stress + tertiary stress e.g. 'super◦market

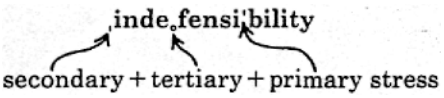
secondary stress + primary stress e.g. ˌsuper 'sonic

Look up the following items in the dictionary and check the stress. Mark the stress.

1. safebreaker
2. safe-conduct
3. safe-deposit
4. safekeeping
5. safety curtain
6. safety-first

Tertiary stress - between secondary and primary stress

There is another context in which tertiary stress occurs. Words with secondary and primary stress sometimes have a rhythmic beat between the secondary and primary stress. This is marked ◦ and referred to as tertiary stress.



EXERCISE 50

AIM: To recognise primary, secondary and tertiary stress when you hear words. To mark primary, secondary and tertiary stress.

KEY Listen to the following words and phrases on the cassette. Each has three stressed syllables, with the last stressed syllable carrying the primary stress. Mark the secondary, tertiary and primary stress in these words and phrases. The first one is done for you.

1. ˌco◦edu'cation
2. intercontinental
3. sadomasochistic
4. valetudinarian
5. Received pronunciation
6. co-efficient of friction
7. occupational therapy

EXERCISE 51

AIM: To recognise stress patterns of words when you hear them (mixed patterns).

KEY Listen to the following words on the cassette. Mark the stress.

1. tyrannicide
6. adolescence

2. indivisibility
3. sacrificial
4. caretaker
5. liberator
7. sacrosanct
8. intellectual
9. unconventionality
10. capitalism

EXERCISE 52

AIM: To use the dictionary to check stress patterns.

a. Mark what you think is the stress pattern on the following words.
b. Then look each word up, and check if your stress marking is correct. Write the correct stress marking, if necessary.

Your stress marking	Correct stress marking
1. habilitate	habilitate
2. habilitation	habilitation
3. habit	habit
4. habitability	habitability
5. habitat	habitat
6. habitation	habitation
7. habit-forming	habit-forming

EXERCISE 53

AIM: To use the dictionary to check stress patterns.

a. Mark what you think is the stress pattern on the following words.
b. Then look each word up, and check if your stress marking is correct. Write the correct stress marking, if necessary.

Your stress marking	Correct stress marking
1. daredevil	daredevil
2. deactivate	deactivate
3. deputation	deputation
4. deputy	deputy
5. deregulation	deregulation
6. derelict	derelict
7. dermatitis	dermatitis
8. derogatory	derogatory
9. desecrate	desecrate
10. discrimination	discrimination
11. dishonest	dishonest
12. dishwater	dishwater

10 Stress shift

Some words seem to change their stress pattern in connected speech; the position of the stress is shifted when the word is followed in a phrase by a more strongly stressed word. Words which are likely to

undergo stress shift are marked ◄ in the dictionary.

middle-aged ˌmɪd ᵊl 'eɪʤd ◄ ˌmiddle-aged 'spread

This means that in isolation, **middle-aged** has primary stress on 'aged'. So in the sentence:
Most Daily Telegraph readers are middle-aged.
'aged' is more prominent than 'middle'.
But in the phrase **middle-aged spread**, with primary stress on the noun 'spread', it is 'middle' and not 'aged' that carries the secondary stress: i.e. 'middle' is more prominent than 'aged'.

EXERCISES 54-58

AIM: To recognise, mark and pronounce words which undergo stress shift.

EXERCISE 54

Listen to the example on the cassette. Notice the stress shift.

arrangements made at the last minute
last minute arrangements

The phrases below can all be transformed in a similar way. Transform each phrase. Mark the secondary and primary stress. The first one is done for you.

1. arrangements made at the last minute *ˌlast-minute arˈrangements*
2. a map drawn to a large scale
3. surgery performed on the open heart
4. a personality which is laid-back
5. a potato-peeler designed for people who are left-handed
6. a letter which is misspelt
7. a person's youth which was misspent

EXERCISE 55

KEY In words of four or more syllables, when stress is shifted, the original primary stress still carries a rhythmic beat; this tertiary stress is marked ◦.

e.g. atmospheric atmospheric pressure

ˌæt məs 'fer ɪk ˌæt məs ◦fer ɪk 'preʃ ə

A similar process may take place in the words and phrases below. Say and mark the stress in the word in isolation, and the phrase containing the word:

1a. audio-visual b. audio-visual aids
2a. automatic b. automatic pilot

3a. occupational b. occupational therapy
4a. operational b. operational research
5a. radioactive b. radioactive decay

EXERCISE 56

  The phrases below are all given in the dictionary as examples of a phrase in which the first element is likely to undergo stress shift.
Each phrase could be expressed in a longer form, with a relative clause:
e.g. next-door neighbours = neighbours who live next door.
Listen to the example on the cassette, and notice the difference in stress when 'next-door' is in final position:

ˌnext-door ˈneighbours = neighbours who live ˌnext ˈdoor

Express each of the phrases below in a similar way. When you say the two versions, be careful to stress correctly the element in final position.

1. trumped-up charges *charges which are trumped up*
2. the mid-day sun
3. an undercover agent
4. unearned income
5. a middle-aged man
6. cast-iron railings
7. a crazy mixed-up kid

EXERCISE 57

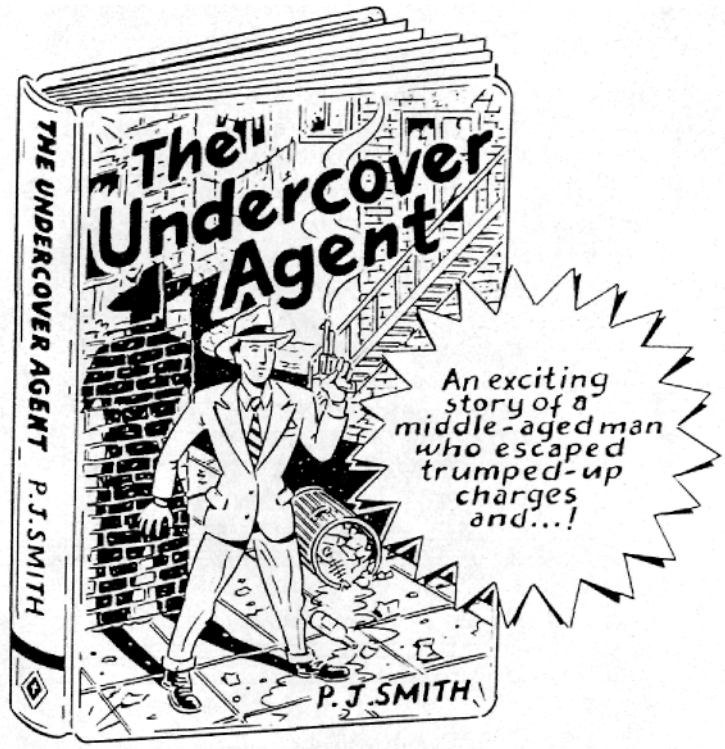
Say the following pairs of sentences.

1. Don't go out at mid-day.
   Don't go out in the mid-day sun.
2. She's always at my right-hand.
   She's always on the right-hand side.
3. They're soft-hearted.
   They're a soft-hearted couple.
4. I'm going via Panama.
   I'm going via the Panama Canal.
5. She was sent overseas.
   She was sent on an overseas posting.
6. John's at university.
   John's at University College.
7. They're cruising in the Adriatic.
   They're cruising in the Adriatic Sea.
8. He's very interested in Latin America.
   He's very interested in Latin-American dancing.
9. The underlying rocks are carboniferous.

The underlying rocks are carboniferous limestone.

10. We're going to Oklahoma.
    We're going to Oklahoma City.

EXERCISE 58



Continue this description of a book, using as many as possible of the words and phrases in Exercises 54 to 57. Compare your version with somebody else's, or record yourself reading it aloud.

11 Compounds and phrases

Early and late stress

There are many English expressions consisting of two words, or in which two words have been combined.
e.g. central heating picture frame dishwasher
Some of these have early stress: primary stress is on the *first* element.
e.g. 'picture frame 'dishwasher
Some have late stress: primary stress is on the *second* element, e.g.
ˌcentral 'heating
Can you give any guidelines for the placement of the ' stress? Write down what you think before you turn over the page.

Early and late stress: some guidelines

Early stress is usual in:

Compounds in which the two elements are written as one word, e.g. '**dishwasher**, '**blackbird**
Expressions consisting of NOUN + NOUN, e.g. '**picture frame**
Late stress is usual in:

Expressions consisting of ADJECTIVE + NOUN, e.g. ˌ**central** '**heating**
Note that a word ending in -ing may operate as a noun

e.g. a '**washing ma◦chine** (a machine for doing the washing)

a '**swimming ◦lesson** (a lesson in swimming)
OR a present participle, with the force of:

an adjective e.g. a ˌ**moving** '**story** (a story which is moving, emotional)

a verb e.g. ˌ**moving** '**pictures** (pictures which move: hence 'movies')

EXERCISES 59-62

AIM: To understand and use guidelines for predicting stress in compounds and phrases.

EXERCISE 59
For each of the expressions underlined in the following text, decide whether it has early or late stress. Write it in the correct column of the table below. The first one is done for you.

I am taking Spanish lessons at the moment. I attend evening classes on Monday evenings at the local Community Centre. We've got an English teacher, and of course her Spanish accent isn't perfect, but she understand the problems we have, and we are making progress. Some of us have formed our own study group, and we meet during the week to practise. One of the members is a civil engineer whose driving ambition is to go to South America. Another is a driving instructor, who keeps his grammar book in the car so he can study between lessons. Occasionally he forgets, and amazes his pupils by giving directions in Spanish.

Early stress e.g. '**picture frame**	Late stress e.g. ˌ**central** '**heating**
Spanish lessons	Monday evenings

The text is recorded on the cassette so you can listen to check

your answers, before you compare your version with the key.

EXERCISE 60

Notice the difference in stress:

a ˈ**blackbird** = a kind of bird: *Turdus merula*

a ˌ**black** ˈ**bird** = any bird which is black

Using this pattern, what would you call the tilings defined below? Write the words and mark the stress.

1a ..... = a teacher of English
b ..... = a teacher who is English
2a ..... = a lightless room for developing photographs
b ..... = a room with not much light in it
3a ..... = a board with a specially treated black surface, traditionally used in classrooms for writing on with chalk
b ..... = a board painted black
4a ..... = a shelf for keeping glasses on
b ..... = a shelf made of glass

Some expressions, which are grammatically compounds, are nevertheless pronounced with late stress (= as if they were phrases). There is no firm rule; that is why many compounds and phrases are listed separately in LPD with their stress patterns.
One group of expressions of this type comprises those where the first element names the **material or ingredient** out of which a thing is made.

a ˌ**rubber** ˈ**duck**

ˌ**paper** ˈ**plates**

ˌ**cheese** ˈ**sandwiches**

ˌ**apple** ˈ**crumble**

a ˌ**pork** ˈ**pie**

Note, however, that expressions involving **cake, juice, water** take early stress.

ˈ**almond cake**

ˈ**orange juice**

ˈ**barley** ˌ**water**

LPD note: COMPOUNDS & PHRASES: 5

EXERCISE 61

The following items can be divided into two groups. Write each item in the correct group.

apple blossom
apple pie
cheese grater
cheese sauce
jam jar
jam sandwich
peach brandy
peach stone
rubber duck
rubber plant
salt beef
salt cellar

Late stress
rubber duck

Early stress
rubber plant

In names of thoroughfares, note that all take late stress except **street**, which takes early stress.

ˌ**Melrose** ˈ**Road**

ˌ**Lavender** ˈ**Crescent**

ˌ**Oxford** ˈ**Circus**

ˌ**King's** ˈ**Avenue**

but ˈ**Gower Street**

LPD note: COMPOUNDS & PHRASES: 6

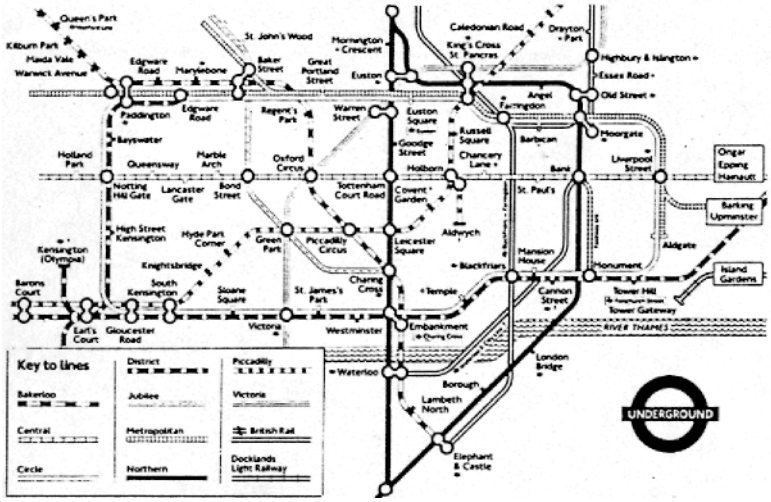
EXERCISE 62

Below is a list of places which a visitor to London might wish to visit, together with the name of the nearest Underground station.

a. Mark the stress in the names of the stations. The first one is done for you.

b. Using the underground map, plan a route, visiting all the places listed, in the most efficient order. Compare your route with someone else's, or record yourself describing your route; make sure you stress the stations correctly.

	Nearest Underground Station
Tower of London	ˌTower ˈHill
National Gallery	Charing Cross
Harrods	Knightsbridge
West End cinemas & theatres	Leicester Square
Madame Tussaud's	Baker Street
Statue of Eros	Piccadilly Circus
Speakers' Corner	Marble Arch
Barbican Centre	Moorgate
British Museum	Tottenham Court Road
shopping	Bond Street, Oxford Circus



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The general guidelines on page 52 are very useful, but they do not give a firm rule for all expressions. That is why many expressions are listed in the dictionary.

EXERCISE 63

AIM: To use the dictionary to check the stress pattern of compounds.

a. Mark what you think is the stress pattern in the following compounds.
b. Then look up each compound, and check if your stress marking is correct. Write the correct stress marking, if necessary.

Your stress marking	Correct stress marking
1. takeaway	takeaway
2. talcum powder	talcum powder
3. tank engine	tank engine
4. tonic water	tonic water
5. top drawer	top drawer
6. touch-type	touch-type
7. totem-pole	totem-pole
8. trapdoor	trapdoor
9. tumbleweed	tumbleweed
10. tumble-drier	tumble-drier
11. tunnel vision	tunnel vision
12. typewriter	typewriter

12 Alternative pronunciations with different stress

Some words have alternative pronunciations which differ from the main pronunciation only in their stress. The alternative stress pattern is

shown using blocks to represent syllables.

e.g. **codriver** 'kəʊ ˌdraɪv ə ▪'▪▪

(The blocks stand for: ˌkəʊ 'draɪv ə)

EXERCISES 64-66

AIM: To understand the conventions used to show alternative pronunciations with different stress. To identify alternative pronunciations when you hear them.

EXERCISE 64

a. Look at the dictionary entries shown below. Listen to the cassette. For each word, the main and alternative pronunciations are given.

1. absolute 'æb sə luːt ˌ▪▪'▪
2. backgammon 'bæk ˌgæm ən ▪'▪▪
3. backpedal, back-pedal ˌbæk 'ped ᵊl ▪ˌ▪▪
4. caviar, caviare 'kæv i *ɑː* ˌ▪▪'▪
5. cigarette ˌsɪg ə 'ret '▪▪▪
6. manageress ˌmæn ɪʤ ə 'res '▪▪▪▪
7. submarine *n, adj* 'sʌb mə riːn ˌ▪▪'▪
8. ˌAdam's 'apple ‖ '▪▪ˌ▪▪
9. ˌIce 'cream, '▪▪
10. ˌradio a'larm '▪▪▪ ▪ˌ▪

KEY b. Listen to the words on the cassette. For each word, circle the appropriate stress pattern shown in a. above.

EXERCISE 65

The words and phrases below all have an alternative stress pattern given in the dictionary

a. Mark what you think are the main and alternative stress patterns. The first one is done for you.

1. value added tax ˌ▪▪ˌ▪▪'▪
2. vaseline ▪▪▪
3. velveteen ▪▪▪
4. verifiable ▪▪▪▪▪
5. vicereine ▪▪
6. video cassette ▪▪▪▪▪
7. video cassette recorder ▪▪▪▪▪▪▪▪
8. violin ▪▪▪
9. violinist ▪▪▪▪
10. Virgin Islands ▪▪▪▪
11. vivisect ▪▪▪
12. vocal cords ▪▪▪
13. voiceover ▪▪▪
14. Voltaire ▪▪

b. Look up the words in the dictionary to check. Correct your marking if necessary.
c. Listen to the sentences below, on the cassette. For each of the words or phrases underlined, identify whether the stress pattern used is that of the main pronunciation or the alternative. Circle the correct letter - M for main, or A for alternative. The first one is done for you.

(M)/A M/A

1. Is value added tax charged on video-cassettes?

M/A M/A M/A

2. My neighbour is a violinist. She plays a violin made in the Virgin Islands.

M/A

3. Old leather books can be preserved by treating the surface with vaseline, and wrapping them in
M/A
velveteen.

M/A

4. I was once offered a job doing a voiceover for a television advertisement. The pay was

M/A

marvellous, but I developed an infection of the vocal cords and couldn't do it.

M/A

5. 'Who said that the only meaningful statements are those which are verifiable by sense

M/A

experience?' 'It sounds like Voltaire.'

Some words have alternative pronunciations involving differences in both stress and sounds.
Consider a word with an unstressed syllable containing a weak vowel
e.g. the first syllable of **applicable** ə 'plɪk ə bᵊl
An alternative pronunciation which stresses the first syllable will contain a strong vowel instead of the weak vowel: æp 'lɪk ə bᵊl

EXERCISE 66

a. Can you give two pronunciations of the following words? Say and write what you think.

1. harass 'hær əs hə 'ræs
2. brochure .....
3. clandestine .....
4. communal .....
6. controversy .....
7. decade .....
8. kilometre .....
9. primarily .....

5. contribute .....
10. subsidence .....

KEY b. Look up the words in the dictionary to check. Notice the stressed syllables and the vowels which are different. Correct your versions, if necessary. Notice which is the main pronunciation.

c. Listen to four sentences, which include the words below, on the cassette. For each word, transcribe the pronunciation you hear, and say whether it is given in the dictionary as the main (M) or alternative (A) pronunciation. The first one is done for you.

1. brochure 'brəʊʃ ə M
2. applicable .....
3. primarily .....
4. subsidence .....
5. decade .....
6. communal .....
7. harass .....
8. controversy .....
9. clandestine .....
10. contributed .....

13 Suffixes

EXERCISE 67

AIM: To consider stress in words with suffixes.

KEY a. Add a suffix to each of the words below to form an abstract noun. Mark the stress in the original word and the related noun. Does the stress change when the suffix is added? Write 'Yes' if it does, and 'No' if it doesn't.

1. 'regular ˌ*regu'larity Yes*
2. inform
3. entertain
4. electric
5. careless

KEY b. Add a suffix to each of the words below to form an adjective. Mark the stress in the original word and the related adjective. Does the stress change when the suffix is added?

1. plenty
2. photograph
3. beauty
4. value
5. Japan

c. Look at the words in a. and b. where the stress changes with the addition of a suffix. You will see that in some cases, the stress falls on the suffix; in others, it has moved to a different syllable of the stem.

We can identify three types of suffix, from the point of view of stress:

Stress-neutral suffix – the suffix does not affect the location of stress in the stem to which it is attached.

e.g. **-ful** '**beauty** '**beautiful**

Stress-imposing suffix - the suffix causes the stress to fall on a particular syllable of the stem.
e.g. **-ion**: stress always falls on the syllable before the suffix

'**fashion e**'**motion** ˌ**infor**'**mation**

Stressed suffix - the suffix itself is stressed, e.g. -**ese** ˌJapan'ese

EXERCISE 68

AIM: To identify types of suffix.

a. Each of the groups of words below contains:
1. a stress-neutral suffix SN
2. a stress-imposing suffix SI
3. a stressed suffix S

But they are not in the same order in every group.
In each group, mark which words contain which type of suffix. The first one is done for you.

A.	'climate 'Portugal 'poison	cli'matic ˌPortu'guese 'poisonous	2. SI 3. S 1. SN
B.	launder comfort period	launderette comfortable periodical	
C.	punctual wide mountain	punctuality widen mountaineer	
D.	cigar economy sympathy	cigarette economic sympathise	
E.	punish picture proverb	punishment picturesque proverbial	

KEY b. Use the suffixes in the words in a. to complete the table below, writing suffixes into the correct column. The first three are done for you.

Stress-neutral	Stress-imposing	Stressed
-ous	*-ic*	*-ese*

Dictionary entries for suffixes show which type of suffix they are, with an example.
e.g. stress-neutral suffix:

-ous əs – **hazardous** 'hæz əd əs || –ərd– **carnivorous** kɑː 'nɪv ər◡əs || kɑːr–

stress-imposing suffix:

-ic *stress-imposing* ɪk – **periodic** ˌpɪər i 'ɒd ɪk ◄ || ˌpɪr i 'ɑːd ɪk◄

stressed suffix:

-ese 'iːz || –'iːs – **journalese** ˌʤɜːn ə 'liːz ◄ ˌʤɝːn– –'liːs ◄ **Japanese** ˌʤæp ə 'niːz ◄

EXERCISE 69

AIM: To remember how suffixes affect stress.

a. Make up sentences or little texts using the words in exercise 68 and other words with these suffixes.
e.g. I sympathise with mountaineers who meet with terribie climatic conditions.
Record yourself saying the sentences, with the correct stress. Use the sentences for reference.

b. As you come across other suffixes, use the table in exercise 68 b to keep a record of them. Make up sentences for those suffixes too.

Part C: aspects of pronunciation in the dictionary

14 American pronunciation

2.3 American pronunciation. The AmE pronunciations shown in LPD are those appropriate to the variety (accent) known as **General American**. This is what is spoken by the majority of Americans, namely those who do not have a noticeable eastern or southern accent. It is the appropriate pronunciation for EFL learners who take AmE as their model, rather than BrE.

American pronunciation is discussed further in LPD INTRODUCTION 2.3, 3.1 and 3.2.

EXERCISES 70-75

AIM: To be able to predict some differences in pronunciation between RP and GenAm.

 Some differences between RP and GenAm:

1. In GenAm, where there is an r in the spelling, it is always pronounced:

bird, Bird bɜːd || bɝːd

cart kɑːt || kɑːrt

teacher, T~ 'tiːtʃ ə || –ər

EXERCISE 70

KEY Give the American pronunciations of the following words:

1. stir .....
2. third .....
3. leader .....
4. larger .....
5. barn .....

2. In some words such as 'fast', where RP has *ɑː*, GenAm (like northern English accents) has æ.

pass pɑːs †pæs ‖ pæs

bath *n* bɑːθ †bæθ ‖ bæθ

after 'ɑːft ə †'æft– ‖ 'æft ᵊr

EXERCISE 71

KEY Give the American pronunciations of the following words:

1. **craft** .....
2. **flask** .....
3. **laughter** .....
4. **banana** .....
5. **past** .....

Notice that not all RP *ɑː* sounds are pronounced se in GenAm:

fath|**er** 'fɑːð |ə ‖ –|ᵊr

3. The distribution of back vowels is different. Compare:

RP

ɒ lot odd

ɔː thought law north war

ɑː start father

GenAm (Note that there is considerable variation among speakers of General American, and not all speakers make all the following distinctions.)

ɑː lot odd start father

ɒː thought law (if not a:)

ɔː north war

oː *variant of* ɔː *in* force, four

EXERCISE 72

KEY What vowel is used in the following words, in RP ami in GenAm? Write each word alongside the correct vowel below, for RP and for GenAm.

card cord harm lawn thorn wrong

RP

1. ɒ .....

2. ɔː .....

3. ɑː .....

GenAm

4. ɑː .....

5. ɒː .....

6. ɔː .....

4. For most Americans, ə and ɪ are not distinct as weak vowels (so that **rabbit** rhymes with **abbot**). For American pronunciation, LPD follows the rule of showing ɪ before palato-alveolar and velar consonants (ʃ ʧ ʒ ʤ k g ŋ), and in prefixes such as **re-**, **e-**, **de-**; but ə elsewhere. Where no separate indication is given for the American pronunciation, it may be assumed that it has ə or ɪ according to this rule.

LPD INTRODUCTION 2.3

EXERCISE 73

Which weak vowel, ə or ɪ, is used in American pronunciation in the unstressed syllable of the following words? Write the correct vowel. The first two are done for you.

ɪ

1. cabbage 3. habit 5. Lenin 7. vanish 9. carriage

ə

2. robin 4. panic 6. wicked 8. arches

5. The RP diphthongs ɪə, eə are replaced in GenAm by pure vowels.

appearancle ə ˈpɪər ən^{t}s ‖ ə ˈpɪr–

Idea aɪ ˈdɪə ˌaɪ–, †–ˈdiːˌə

various ˈveər iˌəs ‖ ˈver iˌəs ˈvær

In some words, some American speakers do include ə before r; this is shown in the dictionary by ʳ.

pier pɪə ‖ pɪʳr

pear peə ‖ peʳr pæʳr

EXERCISE 74

KEY a. Transcribe the RP and GenAm pronunciations of the following words.

RP GenAm

1. **staring**
2. **careful**
3. **dearest**
4. **experience**
5. **variation**
6. **sincerely**

  b. Listen to the words on the cassette. For each one, circle the appropriate pronunciation (RP or GenAm) in a. above.

6. T-voicing

In GenAm, t can be voiced when it occurs between vowels, at the end of a syllable e.g. **shutter** ˈʃʌt̬ ᵊr. It may sound identical with d e.g. **shudder** ˈʃʌd ᵊr. (For a fuller account, see LPD note: T-VOICING.)

EXERCISE 75

 In which of these words would the t be voiced in GenAm? Circle the voiced t's. The first one is done for you.

1. wri(t)ing 3. return 5. softer 7. attack
2. later 4. related 6. attic 8. lightning

EXERCISES 76-77

Quizzes on american pronunciations.

EXERCISE 76

Odd one out.

 Consider the GenAm vowel sound in the stressed syllable in the following groups of words. In each group, one word has a different vowel sound in GenAm from the others. Circle the odd one out.

1. rafter rather rock rod
2. after class father ghastly
3. sordid worthy warden warm

EXERCISE 77

Rhymes quiz.

There once was an old English Lord
Whose views were exceedingly broad.
He said: 'I don't worry
How people say "furry".'
That tolerant old English Lord.

KEY In the following words, find three pairs which rhyme in RP but not in GenAm, and three pairs which can rhyme in GenAm but not in RP. Fill in the table.

abbot bother clerk court father habit laugh mark nought scarf sorry story

RP rhymes	GenAm rhymes

EXERCISE 78

AIM: To study the features of american pronunciation in a spoken text.

CASSETTE The text below is recorded on the cassette, by an American speaker.

KEY Either: Listen to the cassette and transcribe the text. Use the key to check your transcription.

Or: Transcribe the text as you expect it to be spoken by an American speaker. Then listen to the cassette and/or look at the key and compare what you have written.

The car was a dark blue seven-passenger sedan, a Packard of the latest model, custom-built. It was the kind of car you wear your rope pearls in. It was parked by a fire-hydrant and a dark foreign-looking chauffeur with a face of carved wood was behind the wheel. The interior was upholstered in quilted grey chenille. The Indian put me in the back. Sitting there alone I felt like a high-class corpse, laid out by an undertaker with a lot of good taste.

The Indian got in beside the chauffeur and the car turned in the middle of the block and a cop across the street said: 'Hey,' weakly, as if he didn't mean it, and then bent down quickly to tie his shoe.

We went west, dropped over to Sunset and slid fast and noiseless along that. The Indian sat motionless beside the chauffeur. An occasional whiff of his personality drifted back to me. The driver looked as if he was half asleep but he passed the fast boys in the convertible sedans as though they were being towed. They turned on all the green lights for him. Some drivers are like that. He never missed one.

It had been a warm afternoon, but the heat was gone. We whipped past a distant cluster of lighted buildings and an endless series of lighted mansions, not too close to the road. We dipped down to skirt a huge green polo field with another equally huge practice field beside it, soared again to the top of a hill and swung mountainward up a steep hill road of clean concrete that passed orange groves, some rich man's pet because this is not orange country, and then little by little the lighted windows of the millionaires' homes were gone and the road

narrowed and this was Stillwood Heights.
Farewell, My Lovely Raymond Chandler (Penguin edition p. 126)

15 Homophones

A number of dictionary entries show a homophone - another word, with a different spelling, which has the same pronunciation.

write raɪt (= *right*) **bear** *n, v* beə || beᵊr bæᵊr (= *bare*)

EXERCISE 79

AIM: To use the dictionary marking of homophones as a quick way of checking whether pairs of words have the same pronunciation.

In the sentences below, some of the pairs of words underlined have the same pronunciation, and some have different pronunciations. You can check quickly by looking up the first underlined word in each pair. Mark whether the pronunciations are the same (S) or different (D).

1. The government annalist got so depressed studying the annals that he had to go to an analyst for treatment. ..S..
2. A Victorian lady who sat in her parlour and shunned the sun took pride in the pallor of her cheeks. ....
3. I've been on a cruise several times, and the crews have all been very efficient. ....
4. They leant on the door so that their sister couldn't go out until she lent them some money. ....
5. The weather which has been becalming the sailing boats is becoming better. ....
6. The baron ruled over hundreds of acres of barren land. ....
7. The assistant who packed the box left out this packet. ....
8. If the clasp of your brooch is too loose, you could easily lose it. ....
9. There are ten canons at Westchester Cathedral, and ten cannons at Westchester Castle. ....
10. A teacher wouldn't lessen my interest in the subject by giving one tedious lesson. ....

16 Abbreviations

Some abbreviations consisting of the initial letters of words are acronyms - the letters are pronounced as if they are a word:

e.g. **SALT** sɔːlt sɒlt || sɒːlt sɑːlt (Strategic Arms Limitation Talks)

In others, the letters are pronounced separately:

e.g. **VIP** ˌviː aɪ ˈpiː (very important person)

Some abbreviations are pronounced in both ways:

e.g. **VAT** ˌviː eɪ ˈtiː væt (value added tax)

EXERCISE 80

AIM: To use the dictionary to check the pronunciation of abbreviations.

The following items are all commonly abbreviated. Use the dictionary to check whether the initial letters are pronounced as an acronym or separately; enter the abbreviation in the correct column. The first two are done for you.

1. General Certificate of Secondary Education
2. General Agreement on Tariffs and Trade
3. Organisation for Economic Cooperation and Development
4. Organisation of Petroleum Exporting Countries
5. Trades Union Congress
6. Universities Central Council on Admissions
7. University of California at Los Angeles
8. unilateral declaration of independence
9. United Nations Educational, Scientific and Cultural Organisation

Acronym	Separate letters
GATT gæt	GCSE

17 Names of people and places

Slough

Come, friendly bombs, and fall on Slough
It isn't fit for humans now.
There isn't grass to graze a cow
Swarm over. Death!

The town satirised in John Betjeman's poem, and the English county in which it is situated, Berkshire, both have pronunciations which are difficult to predict from their spelling. The dictionary contains a large number of names – English names that may present a problem, the English pronunciation of English names which are commonly used in other languages, the English pronunciation of foreign names.

EXERCISE 81

Quiz.

Use the dictionary to help you answer the questions.

1. **Renault** cars are French - how are they pronounced in England, and in the USA?
2. **Frances** is a woman's name: **Francis** is a man's name and a surname. Is the pronunciation the same or different?
3. **Eau-de-cologne** means literally 'water from Cologne' – but is **cologne** pronounced the same way?
4. The University of Essex is at **Norwich**; the University of Kent is at **Canterbury**, and the nearest town to the University of Sussex is **Lewes**. How are the three places pronounced?
5. **Birmingham**, England, and **Birmingham**, Alabama, USA – same or different?
6. **Olive's olives**: - same or different?
7. 'When I tell English people I come from **Valencia**, they don't understand me.' How do they pronounce **Valencia**?
8. Sir Peter **Pears**, the singer, and **Pears** soap - same or different?
9. **London**: 'lʌnd n or 'lʌnd ən?
10. Edward **Lear**, the poet, and Shakespeare's King **Lear** - same or different?
11. 'Yes, I remember **Adlestrop**'
    'I will arise and go now, and go to **Innisfree**'
    '**Albion's** most lovely daughter sat on the banks of the **Mersey** dangling her landing stage in the water'
    These are the first lines of poems by **Edward Thomas**, **W B Yeats**, and **Adrian Henri** respectively. How are the places, and the poets, pronounced?

18 Assimilation

1. **Assimilation** is a type of COARTICULATION. lt is the alteration of a speech sound to make it more similar to its neighbours.
2. The alveolar consonants t, d, n, when they occur at the end of a word or syllabic, can optionally assimilate to the place of articulation of the consonant at the beginning of the next syllable.

Thus n can become m before p, b, m, as in the examples

ten men ˌten 'men → ˌtem 'men

downbeat 'daʊn biːt → 'daʊm biːt

Similarly, n can become ŋ before k,g, as in:

fine grade ˌfaɪn 'greɪd → ˌfaiŋ 'greɪd

incredible ɪn 'kred əbᵊl → ɪŋ 'kred əbᵊl

In the same way d can change to b and g respectively, as in

red paint ˌred 'peɪnt → ˌreb 'peɪnt

admit əd 'mit → əb 'mit

bad guys 'bæd gaɪz → 'bæg gaɪz

It is also possible for t to change to p and k respectively, though a more frequent possibility is for t to be realized as a GLOTTAL STOP when followed by another consonant:

eight boys ˌeɪt 'bɔɪz → ˌeɪʔ 'bɔɪz (ˌeɪp 'bɔɪz)

Where dictionary entries contain alternative pronunciations which are derived by assimilation, they are preceded by →, the symbol for a pronunciation derived by rule.

EXERCISE 82

AIM: To predict assimilation of alveolar consonants.

The following words, shown with their main pronunciation, all have an alternative derived by assimilation. Write the pronunciation with assimilation.

1. cranberr|y 'kræn bər‿|i →
2. unbalanc|e ˌʌn 'bæl ənᵗs →
3. in|put *v, n* 'ɪn |pʊt →
4. ungrateful ʌn 'greɪt fᵊl →
5. record-break|er/s 'rek ɔːd ˌbreɪk |ə/z †−əd− →
6. midpoint 'mɪd pɔɪnt →
7. broadcast 'brɔːd kɑːst →
8. weedkiller 'wiːd ˌkɪl ə →

5. **Yod coalescence** (or **coalescent assimilation**) is the process which changes t or d plus j into ʧ or ʤ respectively.

6. Wiibin a word, the status of yod coalescence depends on whether the following vowel is strong or weak (see WEAK VOWELS).

– Where the vowel is strong, i.e. uː or ʊə, yod coalescence can frequently be heard in BrE, although it is not considered standard. (In AmE there is usually no j present, so the possibility of assimilation does not arise.)

tune tjuːn → ˈtʃuːn

endure ɪn ˈdjʊə → ˈɪn ˈdʒʊə

– Where the vowel is weak, i.e. u or ə, assimilation is usually variable in RP but obligatory in GenAm.

factual ˈfækt juˌəl → ˈfæk tʃuˌəl

educate ˈed ju keɪt –jə– → ˈedʒ u keɪt –ə–

LPD note: ASSIMILATION 5 & 6

EXERCISE 83

AIM: To identify assimilation when you hear words containing t or d before j.

Look at the dictionary entries below, and listen to the words on the cassette. For each entry, circle the pronunciation you hear. The first one is done for you.

1. **costume** *n, adj* ˈkɒs tjuːm →(†ˈkɒs tʃuːm)
2. **tube** tjuːb →†tʃuːb
3. **mildew** ˈmɪl djuː →†–ˈdʒuː
4. **adduc|e** ə ˈdjuːs →†–ˈdʒuːs
5. **amplitude** ˈæmp lɪ tjuːd →†–tʃuːd
6. **reduc|e** rɪ ˈdjuːs →†–ˈdʒuːs
7. **education** ˌed ju ˈkeɪʃ ᵊn ˌedʒ u–
8. **reconsti|tute** ˌriː ˈkɒnᵗst ɪ |tjuːt →†–tʃuːt

EXERCISE 84

AIM: To identify assimilation when you hear it, including assimilation of final consonants influenced by the following word.

The following text is recorded on the cassette. Use it as you wish. Three different approaches are suggested.

Suggestion 1. Listen to the cassette, and transcribe the text, paying particular attention to assimilation.

Suggestion 2. Read the text, and predict where assimilation might take place. Underline the sounds you predict. Then listen to the cassette and check how those sounds are pronounced.

Suggestion 3. Listen to the cassette with the text in front of you. Circle the words where you hear assimilation.

He swung round startled. *A knock on his door!* There must be some mistake. Or his ears were playing him tricks. The darkness of the room – for he had not yet switched on the lights – made his seem more plausible. But no – the knock was repeated.

'Come in,' he said in a thin, cracked voice, and cleared his throat. 'Come in!' He moved eagerly towards the door to welcome his visitor, and to turn the lights on at the same time, but collided with a chair and dropped his cigar, which rolled under the table. He dived after it as the door opened. A segment of light from the corridor fell across the floor, but did not reveal the hiding-place of the cigar. A woman's voice said uncertainly, 'Professor Zapp?'

'Yeah, come in. Would you switch the light on, please?'

The lights came on and he heard the woman gasp. 'Where are you?'

'Under here.' He found himself staring at a pair of thick fur-lined boots and the hemline of a shaggy fur coat. To these was added, a moment later, an inverted female face, scarved, red-nosed and apprehensive. 'I'll be right with you,' he said. 'I dropped my cigar somewhere under here.'

Changing Places David Lodge (Penguin edition pp. 83-84)

Assimilation is also included in section 19, Pronunciations derived by rule, on pages 78-79. There is further discussion of assimilation in the note ASSIMILATION in LPD.

19 Pronunciations derived by rule

The symbol → shows that an alternative pronunciation is the result of a general rule which affects not just this word but a whole range of words and phrases in the language. The dictionary only shows the results of such rules when they operate within the word, independently of surrounding words.

Examples:

question 'kwes ʧən →'kweʃ–,

Assimilation of the s, anticipating the following ʧ, produces 'kweʃ ʧən

newspaper 'nju:s ˌpeɪp ə

Assimilation: the z of nju:z is devoiced, anticipating the following unvoiced p. (This pronunciation is now standard).

handbag 'hæn*d* bæg →'hæm–

Elision: 'hænd bæg becomes 'hæn bæg

+ assimilation: 'hæn bæg becomes 'hæm bæg

cold kəʊld →kɒʊld

Some varieties of RP use the special allophone ɒʊ before l in the same syllable.

includ|e ɪn 'klu:d →ɪŋ–

Anticipatory dealveolar assimilation of the n- anticipating the following k. produces jq 'klurd.

induc|e ɪn 'djuːs →†–'ʤuːs

Assimilation: coalescence of d and j to form ʤ.

EXERCISE 85

AIM: To identify rules affecting alternative pronunciations.

KEY The dictionary entries below all include an alternative pronunciation derived by rule from the main pronunciation. In each case, state what rule is involved, as in the examples on page 80.

1. **refinement** rɪ 'faɪn mənt rə–, †riː–, →–'faɪm–
2. **patrol** pə'trəʊl →–'trɒʊl
3. **tempestuous** tem 'pes ʧu◡əs təm–, →–'peʃ–;
4. **cardboard** 'k*a*ːd bɔːd →'k*a*ːb–
5. **institution** ˌɪnᵗst ɪ 'tjuːʃ ᵊn –ə–, →†–'ʧuːʃ–
6. **handgun** 'hæn*d* gʌn →'hæŋ–
7. **enfold** ɪn 'fəʊld en–, ən–, →–'fɒʊld
8. **Wibsey** 'wɪb si –zi –*The place in WYks is locally also* →'wɪp si
9. **tune** 'tjuːn →†'ʧuːn
10. **landmark** 'læn*d* m*a*ːk →'læm–

20 Incorrect pronunciations

–For a few words, LPD includes a pronunciation variant that is not considered standard. Although generally seen as incorrect, these variants are included because of the fact that they are in widespread use. They are marked with the special sign ⚠.

LPD INTRODUCTION 2.2

EXERCISE 86

AIM: To use the dictionary to check whether pronunciations are considered incorrect.

a. Listen to the text below, being read by an aspiring newsreader. Transcribe the whole text, if you wish.

KEY b. Twelve words are pronounced in a way which is not the main pronunciation. Underline what you think are the twelve words. Transcribe the pronunciation of these words, as you heard it. Compare your version with the Key.

KEY c. Use the dictionary to check the status of these pronunciations: are they alternative, regional, or 'incorrect' pronunciations? Complete the table.

INTERNATIONAL RADIO NEWS CORPORATION
TEST PIECE FOR APPLICANTS FOR POSTS AS NEWSREADERS

Several London papers claimed today that a burglary had taken place at Buckingham Palace. A spokesperson refused to confirm whether or not anything had been stolen.

A nuclear power station in Bangor, North Wales, has been closed down, while maintenance work is carried out. Asphalt on the roof of the main reactor building has cracked, and accumulated debris needs to be removed. A local pressure group claim that increased incidence of migraine in the area is due to radiation escaping through the cracks. The management of the plant reject this as a mischievous attempt lo cause alarm.

And now here is the latest weather forecast from the Meteorological Office ...

Word	Pronunciation on cassette	Alternative, regional, or 'incorrect'?	Recommended pronunciation
burglary	bɜːg əl ri	*incorrect*	bɜːg lər i

21 Combining forms

1 Many learned words are composed of **combining forms** derived from Greek or Latin. These words consist of a first element and a second element. For example, **micro-** plus **-scopic** gives **microscopic**. LPD contains entries for these separate elements, which makes it possible to work out the pronunciation of many unlisted rare or new words.

2 Most combining form **suffixes** (= second elements) are **stress-neutral** (= they preserve the location of stresses in the first elemeni). Others are **stress-imposing** (= they cause the main stress to fall on a particular syllable of the first element).

3 A first element usually has two different pronunciations, one used with stress-neutral suffixes, the other with stress-imposing suffixes. For the pronunciation of the whole word, the pronunciation for the suffix musi be combined with the appropriate pronunciation for the first

element.

4 The mark ˌ' in the pronunciaiion of a first element means a stress. This will be a secondary stress (ˌ) if the suffix includes a main stress. If not, it will be a main stress (').

For example, take the first element **cata**-. With a stress-neutral suffix, it is pronounced ˌ'kæt ə. Combining this with -**graphic** 'græf ɪk we get **catagraphic** ˌkæt ə 'græf ɪk. Combining it with -**phyte** we get **cataphyte** 'kæt ə faɪt.

5 With a stress-imposing suffix, **cata**- is pronounced kə 'tæ̈. (The sign ̈ is a reminder that this syllable is incomplete and must attract at least one consonant from the suffix.) Combining **cata**- with -**logy** lədʒ i (stress-imposing), we get **catalogy** kə 'tæl ədʒ i.

The words **catagraphic**, **cataphyte**, **catalogy** probably do not exist. But an author could easily invent them. If they were to be used, this is how they would be pronounced.

EXERCISE 87

AIM: To understand dictionary entries on combining forms.
Study the entries below for first elements and suffixes.

First elements	**Suffixes**
caco- *comb. form* *with stress-neutral suffix* ˌ'kæk əʊ‖–ə –**cacographic** ˌkæk əʊ 'græf ɪk ◄ ‖–ə– *with stress-imposing suffix* kæ 'kɒ̈ kə– ‖kæ 'kɑ:̈ –**cacography** kæ 'kɒg rəf ɪ kə– ‖– 'kɑ:g–	-**gamy** *stress-imposing* gəm i
cardio- *comb. form* *with stress-neutral suffix* ˌ'kɑ:d i◡əʊ ‖ˌ'kɑ:rd i◡oʊ ◡ə –**cardiomyopathy** ˌkɑ:d i◡əʊ maɪ 'ɒp əθ i ‖ˌkɑ:rd i◡oʊ maɪ 'ɑ:p– *with stress-imposing suffix* ˌkɑ:d i 'ɒ̈‖ˌkɑ:rd i 'ɑ:̈ –**cartography** ˌkɑ:d i 'ɒg rəf i ˌkɑ:rd i 'ɑ:g–	-**genous** stress-imposing dʒən əs –

endo- *comb. form* *with stress-neutral suffix* ˌ'end əʊ ‖ˌ'end ə –**endocranial** ˌend əʊ 'kreɪn i◡əl ◄ –ə– *with stress-imposing suffix* en 'dɒ̈ ‖en 'daːˈ̈ –**endogenous** en 'dɒdʒ ən əs –ɪn– ‖–'daːdʒ–	-**gram** græm
mono- *comb. form* *with stress-neutral suffix* ˌ'mɒn əʊ ‖ˌ'maːn ə –oʊ, *but before a vowel always* –əʊ ‖–oʊ –**monochord** 'mɒn əʊ kɔːd ‖'maːn ə kɔːrd –**monoacidic** ˌmɒn əʊ ə 'sɪd ɪk ◄ –æ'– ‖ˌmaːn oʊ– *with stress-imposing suffix* mə 'nɒ̈ mɒ– ‖mə 'naːˈ̈ maː– –**monology** mə 'nɒl ədʒ i mɒ– ‖mə 'naːl– maː–	-**graphic** 'græf ɪk
octa- *comb. form* *with stress-neutral suffix* ˌ'ɒkt ə ‖ˌ'aːkt ə –**octachord** 'ɒkt ə kɔːd ‖'aːkt ə kɔːrd *with stress-imposing suffix* ɒk 'tæ̈ ‖aːk 'tæ̈ –**octameter** ɒk 'tæm ɪt ə –ət– ‖aːk 'tæm ə̩t ᵊr	-**gonal** *stress-imposing* gᵊn əl
poly- *comb. form* *with stress-neutral suffix* ˌ'pɒl i ‖ˌ'paːl i -*but in certain more familiar words, before a consonant, also* ˌ'pɒl ə ‖ˌ'paːl ə –**polygenesis** ˌpɒl i 'dʒen əs ɪs –ɪs ɪs, †–əs ‖ˌpaːl– *with stress-imposing suffix* pə ˌ'lɪ̈ pɒ– –**polyphagous** pə 'lɪf əg əs pɒ–	-**phony** *stress-imposing* fən i

The following words combine elements shown above. Write the pronunciation of each word. (If you already know the pronunciation, look to see how the information is conveyed in the dictionary entries. If you are not sure of the pronunciation, work it out from the entries. Then you can check the transcription in the key, and listen to the pronunciations on the cassette.)

1. cacophony .....
2. cardiographic .....
3. endogenous .....
4. monogram .....
5. octagonal .....
6. polygamy .....

EXERCISE 88

KEY AIM: To use dictionary entries to predict pronunciation of unfamiliar words.

Many other words can be formed by combining the elements shown in exercise 1. Some will be familiar, others will be unfamiliar either because you haven't met them before or because you have just created them. Devise ten words that are unfamiliar to you, and work out how they would be pronounced.

e.g. **endographic** ˌend əu 'græf ɪk

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