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Patricia Ashby

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# Phonetics

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# Phonetics

Patricia Ashby

**Understanding  
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Bernard Comrie  
and  
Greville Corbett

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# Preface

Phonetics is something that all of us do, every day, every time we open our mouths and speak. We even do it when we listen to other people speaking. But we do it all subconsciously. Studying phonetics as a discipline raises this to conscious awareness.

Phonetic data embraces every sound of every living language – some 5,000 to 8,000 at the present count – and the subject has two distinct sides to it: theory and practice. These often complement each other, and this book, with its accompanying website ([www.routledge.com/cw/ashby](http://www.routledge.com/cw/ashby)), is designed to give you experience of both. A further fact about the subject is that, although the majority of students who study it come from the arts and humanities, phonetics is actually quite a scientific discipline.

When students first hear about phonetics, the amount of work (theory and practice) together with its scientific nature can sometimes seem like a double whammy. However, speech is fascinating, and if you are even just a tiny bit curious, phonetics has a tremendous amount to offer.

The size of the subject also needs to be kept in perspective. How big is your mouth? Relatively speaking, mouths are small. They contain just a few organs with which we are already moderately familiar: lips, teeth, tongue, and the roof of the mouth, and down the throat to the larynx. Phonetics simply makes very careful observations about what this small number of organs does when we speak. Engaging in practice, alongside learning the theory, usually helps to clarify and reinforce these observations. This volume offers you the opportunity to do this, providing numerous practical, skills-based exercises (in the book itself) and parallel ear-training activities (see accompanying website). Exercises are integrated through the text and should be attempted as part of reading the book, especially if you are studying independently. The ear-training exercises (and web-based feedback and explanations that accompany these) will help your learning in several ways. They will reinforce the theory with the experience of listening to some of the effects being described. They will also help you to use the symbols, to write these in transcription. And they will help you to think in terms of sound rather than spelling – especially important when working on English, which is taken as our shared or common language throughout.

As far as the science is concerned, at least when you first start to study the subject, you will probably find it is actually less daunting even than your experience of science during secondary education. There is a little bit of anatomy (but remember how small the mouth is!) and a little bit of physics – that is about all.

What the present volume aims to do is to show you how speech sounds are made, giving you a thorough grounding in basic distinctions and sound types, before offering more advanced insights into the wide range of variation observable in the pronunciation of both vowels and consonants. Examples are drawn from a range of languages from across the world and are compared and contrasted with our shared language of English. You will learn to describe and represent these sounds (through transcriptions and diagrams) and to recognise them (by means of ear-training and by interpreting the acoustic representations offered in spectrograms). Representation of sounds throughout relies on using the symbols of the International Phonetic Alphabet (see page xvi) and, deriving from this, a set of commonly used symbols for transcribing English (page xv).

A huge number of people have contributed in many ways to the information provided here, offering advice, ideas and examples. My thanks are due first and foremost to the series editors, Bernard Comrie and Grev Corbett whose patience, encouragement, enthusiasm and support has been of immeasurable importance, and to the in-house, practical editorial support from staff at Hodder Education, especially in the early stages, Tamsin Smith, and latterly, Bianca Knights and Lavinia Porter.

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Finally, my thanks also to my daughter, Christabel Ashby, who not only gave me her support, but who kindly agree to let me use her head in a very literal way (in X-ray form in [Figure 3.2](#)), to my sons, Jonathan and Dominic Ashby, and to Bogna Lesniewicz.

*Patricia Ashby*  
London  
March 2011

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## Acknowledgements

Grateful thanks are due to Laryngograph Ltd for permission to reproduce the precision stroboscopic images and linked laryngograph (EGG) waveforms in [Figure 2.2](#) (page 17) and [Figure 2.5](#) (page 20).

Figure Exercise 9.1 Pattern Playback image 15 used with kind permission of Haskins Laboratories, New York.

The International Phonetic Alphabet (2005) is reproduced by kind permission of the International Phonetic Association (Department of Theoretical and Applied Linguistics, School of English, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece) and to Barbro Bruce, widow of the late Gösta Bruce, for her help and kindness in permitting reproduction of the image in [Figure 10.5](#) (page 170).

Thanks are also due to Elsevier ([Figure 3.2](#) on page 32), University of Chicago Press ([Figure 6.5](#) on page 90), Cambridge University Press ([Figure 6.6](#) on page 91), Blackwell ([Figure 6.8](#) on page 93), Hodder Education ([Figure 8.14](#) on page 139), and Springer Verlag ([Figure 10.6](#) on page 172).

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# Symbols for Transcribing English

Following WELLS, J.C. (2008) *The Longman Pronunciation Dictionary*. London, Longman.

All examples in this list are based on Modern RP (MRP) pronunciation.

## Vowel symbols

i:	see	/si:/	ʌ	cup	/kʌp/
ɪ	sit	/sɪt/	ɜ:	bird	/bɜ:d/
i	happy	/'hæpi/	ə	about	/ə'baʊt/
e	ten	/ten/	eɪ	say	/seɪ/
æ	cat	/kæt/	əʊ	go	/gəʊ/
ɑ:	calm	/kɑ:m/	aɪ	five	/faɪv/
ɒ	got	/gɒt/	aʊ	now	/naʊ/
ɔ:	saw	/sɔ:/	ɔɪ	boy	/bɔɪ/
ʊ	put	/pʊt/	ɪə	near	/nɪə/
u:	too	/tu:/	eə	hair	/heə/
u	situation	/sɪtʃu'eɪʃn/	ʊə	pure	/pjʊə/

## Consonant symbols

p	pen	/pen/	s	source	/sɔ:s/
b	bad	/bæd/	z	zoos	/zu:z/
t	tea	/ti:/	ʃ	shoe	/ʃu:/
d	did	/dɪd/	ʒ	vi <u>si</u> on	/'vɪʒn/
k	cake	/keɪk/	h	hat	/hæt/
g	got	/gɒt/	m	man	/mæn/
tʃ	chain	/tʃeɪn/	n	no	/nəʊ/
dʒ	jam	/dʒæm/	ŋ	sing	/sɪŋ/
f	fall	/fɔ:l/	l	leg	/leg/
v	van	/væn/	r	red	/red/
θ	thin	/θɪn/	j	yes	/jes/



# Starting phonetics

*This chapter will look at what we already know about phonetics, exploring writing and spelling, texting and talking. It looks at the relationship between speaking and spelling and between speech sounds, letters of the alphabet and symbols. The IPA chart and transcription are introduced and the different types of phonetics (articulatory, acoustic, auditory), accents, our attitudes to what people sound like, and the phonetics/phonology interface.*

## 1.1 WHAT WE ALREADY KNOW

### 1.1.1 Writing

Before we look more deeply into phonetics, it is worth finding out what we already know about this subject. Far from being a strange and different discipline, phonetics touches our everyday lives in a huge number of ways and has done so since the moment we were born (and maybe even earlier, while we were still in the womb). Phonetics, of course, is the study of speech sounds, but before we can really get to grips with these, we need to dispel a few myths about writing and spelling, and explore the relationship between the spoken and written forms of languages.

Most of us learn to speak very early in our lives but at school we all grapple with the intricacies of writing. Around the world, the first writing system many of us use is based on applications of the **Extended Latin Alphabet** (ELA). (If you are not sure what this means, check it out by looking at the fonts and symbols available on your computer.) Our familiarity with this alphabet, and with other alphabets such as the Greek alphabet, depends very much on where we live in the world. In the Faroe Islands, for example, shapes such as æ, ø and ð are part of everyday orthography (see [Figure 1.1](#)). In Greece, ε, β and φ are taken for granted in the same way. It is shapes like these from the ELA plus a few extras from the Greek alphabet that we use to ‘write phonetics’. We give the name **transcription** to this writing and instead of referring to letters, we call the shapes that we use **symbols**.



Figure 1.1  
Faroeese street sign meaning ‘Doctor’s surgery’.

One advantage to transcribing is that once you have learnt the various symbols of the **International Phonetic Association's** alphabet<sup>1</sup> (reproduced in what is called the **IPA chart** on page xiv), you can write down what people are saying regardless of the language they are speaking. This is a massive bonus! You can write down what people are saying not only in English, French and Spanish, but also in Chinese, Korean, Russian, Arabic or Cherokee without ever having to learn a new writing system at all. With training, you can learn to write down the speech sounds of any one of the 5,000 to 8,000 living languages spoken in the world today.

### 1.1.2 Spelling

Writing is one thing, but spelling is quite another. Some languages have what we call 'phonetic spelling' – when you write words in normal orthography, it is almost the same technique as transcribing them because particular letters of the alphabet or specific groups of letters always refer to the same sound. In fact, the correct term for this is **phonemic spelling**. So, in languages like Malay, for example, or Italian, once you have learnt the spelling-to-sound rules, you can often say words out loud and sound quite authentic even without knowing the language itself. Dutch, too, has a reasonably phonemic spelling system and many syllabaries are phonemic in structure, but perhaps the most phonemic spelling system of all is the Mkhedruli alphabet used to write Georgian (see [Figure 1.2](#)). Developed as early as the third century AD, every distinctive sound has its own orthographic representation. In comparison, a language like English is a learner's nightmare and this is true whether you are a native-speaker at school learning to spell and read or a non-native speaker learning to read, write and pronounce the language.

ჩრდილოეთის ქარი და მზე კამათობდნენ თუ რომელი იყო უფრო ძლიერი. ამ დროს გაიარა ერთმა ნაბაღწამოხურულმა მგზავრმა. ისინი შეთანხმდნენ უძლიერესად ეცნოთ ის, რომელიც მგზავრს პირველი მოახდევინებდა ნაბაღს. ჯერ ჩრდილოეთის ქარმა დაუბერა მთელი ძალ-ღონით, მაგრამ რაც უფრო ძლიერ უბერაედა, მგზავრი მით უფრო მაგრად ეხვეოდა ნაბაღში. ბოლოს ჩრდილოეთის ქარი დაცხრა. ახლა მზემ გამოაბრწყინა და დააცხუნა. მგზავრმა ნაბაღი მაშინვე მოიხადა. ამრიგად, ჩრდილოეთის ქარი იძულებული გახდა ეღიარებინა, რომ მათ შორს მზე უფრო ძლიერი იყო.

Figure 1.2 Example of Georgian writing from *The North Wind and the Sun*.<sup>2</sup> Source: Shosted & Chikovani (2006).

<sup>1</sup>The International Phonetic Association, instituted in 1886, is a professional organization of phoneticians.

<sup>2</sup>This Aesop's fable, *The North Wind and the Sun*, is used by the IPA as a test passage, translated into the target language and then recorded. A range of recordings from the IPA's *Handbook* can be freely downloaded from <http://web.uvic.ca/ling/resources/ipa/handbook.htm>.

## Ex 1.1

Look at the following short utterances written in Georgian:

- (1) ნელა
- (2) დალაქი
- (3) გუდა
- (4) ზარი
- (5) ცერი

Unless you know the language and have learnt how to read it, you will not be able to read (1)–(5) above. However, once they are re-written, using *transcription* (based on broad phonetic symbols for Georgian) you will find you can easily begin to read them and say them aloud. You won't sound exactly like a native speaker of the language, but at least you can give it a try:

- (1) [nela] *slowly*
- (2) [dalaki] *barber*
- (3) [guda] *leather bag*
- (4) [zari] *bell*
- (5) [tseri] *thumb*

**Hint:** [e] is similar to the sound in English *bed*, [a] is similar to the sound in English *palm*. (Note the convention of placing phonetic transcriptions inside a pair of square brackets.)

A language more familiar to many of us is Italian. In Italian, *c(c)* followed by <a>, <u> or <o> reflects the [k]-sound (like the second sound in the English word *skin*). In English, however, this same sound can be spelled *c(c)* in *cake* or *occur*, *k* or *ck* in *kick*, *(c)q(u)* in words like *racquet*, *bouquet*, *unique*, *queue* (which starts [kj-] when we say it, as if it ought to be spelled <ky>) or *quiet* (which starts [kw-], as if it was spelled <kw>). But in phonetic transcription (sometimes also called 'phonetic spelling') every time you hear a [k]-sound, you write a k-shape – Italian *casa* would look more like <kasa> and English *cake*, *occur* and *kick* (provided we just concentrate on the [k] sound) more like <kake, okur, kik> while *racquet*, *bouquet*, *unique*, *queue* and *quiet* would be transformed into something more like <raket, bouket, yunike, kyue, kwiet>. Of course, there are still glaring problems in the English words, but the Italian example is now almost a proper phonetic transcription, [kasa].

The vagaries of English spelling were encapsulated once and for all by the spelling-reformer and playwright, George Bernard Shaw, who invited us to read the English word *fish* spelled *ghoti*: effectively a [f]-sound as at the end of words like *cough* or *enough*, followed by an [ɪ]-sound like the **vowel sounds** in *women* (the first of which, even though it sounds the same as the vowel in *sit*, is unhelpfully spelled with the letter <o>) and a [ʃ]-sound like the one at the beginning of *sharp* which we find spelled <ti> in *station*. If only we spelled as we transcribe, [fɪʃ] (*fish*), [kɒf] (*cough*), [ˈwɪmɪn] (*women*) and [ˈsteɪʃən] (*station*) would all start to look much more straightforward and more directly related to what we actually hear when we say them.

## Ex 1.2

Try to work out what this sentence says. (Transcription is far more intuitive than spelling.)

[ɪf aɪ 'swɪtʃ ət ðɪs 'pɔɪnt tə fə'netɪk træ'n'skrɪpʃən | ju 'maɪt bi sə'praɪzd tə 'faɪnd ju kən 'stɪl 'rɪ:d ə 'lɒt əv wɒt aɪ 'raɪt]

Ex 1.3 This awareness of sound/spelling relations is behind the product name of an ice-cream called Phish Food. Can you explain this? How does it sound when we say it and why can the manufacturers spell it this way?

### 1.1.3 Speech sounds

So far, we've taken for granted the concepts of *letters* on the one hand and (*speech*) *sounds* on the other. The short transcriptions in the above paragraphs look more or less transparent next to the orthographic versions of the words they represent. But there are some interesting differences in the two versions and these differences are a direct product of the fact that there are different sorts of speech sounds – the previous paragraph, for example, makes reference to 'vowel sounds'.

Speech consists of alternations between two major sound-types: vowels and **consonants**. In some orthographies, these two sound-types are represented systematically by vowel letters and consonant letters. In others, however, like English, there is some overlap. The sound on the end of *funny*, for example, is a consonant letter *y*, but when we say the word aloud, we pronounce a vowel sound, [ɪ]. The next thing we need to do, then, is to make sure we can keep the ideas of letters and sounds separate (in other words, forget about spelling) and then to ensure that we can recognize some of the different types of sounds – consonants as opposed to vowels, and certain different types of vowel sound.

If we take the English word *women* that we looked at above, the alternation of sounds matches the clues we get from the spelling: consonant (*w* sounding [w]), vowel (*o* sounding [ɪ]), consonant (*m* sounding [m]), vowel (*e* sounding [ɪ] again), consonant (*n* sounding [n]). If we represent each consonant sound by C and each vowel sound by V, we can describe the pattern of this utterance as CVCVC and that matches what we saw in the transcribed form ['wɪmɪn]. Of course, it is always the case that different accents of English might have slightly different ways of pronouncing some of the sounds – especially vowel sounds – but for the moment, I will stick with what we might call the codified norm, **Modern Received Pronunciation** (MRP) or **Standard Southern British English** (SSBE) (Cruttenden (2008)). The actual pronunciation is not important here and regardless of the accent we have, the consonant and vowel categories of the sounds will be the same.

Some of the other examples have spellings which are much less closely related to the sound pattern: *cough*, for example. Here, although the spelling starts with a single letter *c* corresponding to the [k]-sound we identified which is a consonant sound, we can only hear one vowel-sound in this word (an [ʊ]-sound, like the sound in MRP *hot* or *off*), so we need to ignore completely the rather

unnecessary *ou* spelling. The problem with the final *gh* has already been discussed – these letters reflect the single consonant sound [f]. So *cough* has the sound pattern CVC which parallels the phonetic transcription [kɒf].

Greater disparity can be noted in *station*. When spoken, the pattern we hear in this word is CCVC(V)C. Initial *st* is relatively unproblematic – we can identify a [s]-sound and a [t]-sound. But in many accents of English, including MRP, if you listen carefully to the next sound (represented in the spelling by *a*) it changes quality. That gliding or changing sound quality is a special sort of vowel, a two-part or two-sound vowel, technically called a **diphthong**. It is one kind of **complex vowel**. This changing quality is recognized in the transcription by a special two-part symbol [eɪ]. So far then, we have CCV-. The next two letters (a consonant letter *t* and a vowel letter *i*) have already been recognized as combining to represent a single consonant sound [ʃ]. So this leaves *on*. Here, there is another conundrum. If you go round listening to how people say this word, some use a vowel sound and finally a consonant sound, saying something like [ɔn] while others omit the vowel altogether and just say the last consonant, [n]. This gives us two possible sound patterns to listen out for: CCVCVC and CCVCC. Both variants are possible and both are recognisable and acceptable. (Vowels which do not glide, like the vowels in *women* or the vowel in *cough*, are single-quality vowels called **monophthongs** – monophthongs are **simple vowels**.)

**Ex 1.4 Can you say which of the following words have a simple vowel (monophthong) and which have a complex vowel (diphthong)? (Your answer will depend on your accent, but non-native speakers are advised to stick to MRP.)**

1 beach	2 fine	3 pound	4 breeze	5 boy
6 day	7 head	8 young	9 through	10 no

**Ex 1.5 Write the CV-patterns for each of the following English words:**

1 spin	2 cream	3 tomato	4 Spain	5 wrought
6 attack	7 psychic	8 cupid	9 Anglo-Saxon	10 announce

Clearly, it doesn't make sense to say that we speak using letters of the alphabet. We spell using them, but we speak using speech sounds or **phones**. The relation between these sounds and the alphabet letters used in romanized representations of languages varies in closeness. In English, although spelling can occasionally help, the relationship on the whole is often rather remote. When we are looking at the different sounds in specific languages, another name we often use instead of phone is **segment**.

Another feature of a language like English is that some pronunciations correspond to multiple spellings. We have words that look different but which sound exactly the same. Such words are called **homophones** (from Greek 'homo' *the same* and 'phone' *sound*). The plural of the letter name *C* (Cs) and the words *seas*, *sees* and *seize*, for example, are all pronounced [si:z] in MRP. Other examples would be *rowed* and *road* [ɹəʊd], *file* and *phial* [faɪl], *passed* and *past* which, again in MRP, would be something like [pɑ:st], or

*two*, *too*, *to* which could all be pronounced [tu:]. Worse still, we have words that look the same (called **homographs**) but which have more than one way of being pronounced – *bow*, for example, can be said [bau] if we are talking about bending from the waist, or the front end of a boat, but if we are talking about an elaborate knot in a piece of ribbon, or about a piece of musical equipment, then we say [bəʊ].

**Ex 1.6 Say if the following word pairs are homophones or not in your accent.**

1 rain, reign	2 tense, tens	3 write, right	4 cue, Q
5 glaze, glaze	6 age, H	7 frees, frieze	8 lock, loch
9 mouth, mouthe	10 way, weigh		

**Ex 1.7 In many accents of English, each of the following words has at least one homophone – give examples.**

1 eye	2 tacks	3 stair	4 which	5 taught
6 site	7 bail	8 hi	9 awe	10 Y

### 1.1.4 Texting

In spite of the remoteness, spelling doesn't stop us from being very sensitive to sounds, even if we are not always responding at a particularly conscious level of awareness. The centuries' old **rebus** puzzles (using pictures and letters combined with plus and minus signs to encode words and messages) rely on this tacit awareness, as in [Figure 1.3](#).

The same sort of phonetic awareness underpins texting. For many of us, texting is now part of our daily life. Our text messages show our phonetic awareness in two ways. The most obvious is the way we capitalize on homophones to reduce the number of letters we need to key into our message: R U comin 2 nite? Wil U B l8? (*Are you coming tonight? Will you be late?*) Such text messages capitalize on the homophonous pairs *R* and *are* (which can both be pronounced [ɑ:]), *U* and *you* (pronounced [ju:]), *2* and *to* ([tu:]), *B* and *be* ([bi:]), and the patching of the letter *l* with the number *8* ([eit]) to coin *late* ([leit]). Together with our awareness of the possibility of g-dropping at the end of words like *coming* (giving the pronunciation often represented in literature as *comin'*), our understanding



Figure 1.3  
Rebus puzzle: *I can hear you.*

that *nite* and the mis-spelled *wil* will be understood/pronounced exactly as if they were spelled *night* and *will* respectively, this is all part of our existing knowledge of phonetics.

We also know that when we send a *txt msg* our reader will supply correctly the missing sounds...

### 1.1.5 Talking

Far from clearly articulating every sound when we speak, in rapid informal talking, we tend to engage in a sort of verbal form of texting.

If I quickly tell someone *I'm going to be late*, what comes out is very unlikely to bear much resemblance to the **citation form** of each word that you might find in a pronouncing dictionary (a dictionary such as Wells (2008), for example, [aɪ æm 'gəʊɪŋ tuː biː 'leɪt] – see below for an explanation of the stress mark [']). Even at our most formal, we make all sorts of adjustments to this string when we speak – [aɪm 'gəʊɪŋ tə biː 'leɪt], for example (where [ə] represents the sound at the beginning of a word like *above* [ə'buːv]). Much more likely, however, in rapid informal communication are extremely reduced variants such as [əm 'gəʊnə biː 'leɪt] or even [əŋəʊnəbə'leɪt].

What is amazing is that there is nothing wrong with a message like this at all and that in spite of its apparent remoteness from our starting point (the citation forms of the words) we still understand each other perfectly.

### 1.1.6 Syllables and stress

We also know one or two other things about the spoken form of our language. These are quite tricky linguistic concepts but for our present purpose it will be enough to remember what was learnt at school. We know something about the notion of the **syllable** and something about what phonetics calls **stress**. This knowledge often relates to studying poetry – giving lines of verse a particular **rhythm**, for example. We can only do that if we get the number of syllables and the number and distribution of stresses or rhythmic beats correct.

One of the best ways to illustrate how this works in English is to look at the structure of the **limerick**. Years ago, I taught for a time at the University of Reading and while there, my students wrote two limericks – one about phonetics and one about me! The one about me went:

There was a young teacher of sounds  
 Who from larynx to lips knew no bounds.  
 Her whole oral cavity  
 Caused enormous hilarity;  
 The class laughed so much they lost pounds.

In discussions of poetry, you often see the rhythmic beats (the syllables on which you might tap your foot or clap your hands, if you were keeping in time to the rhythm) marked by an acute accent over the vowel: *There wás a young téacher of sóunds*, etc. Likewise, if you were asked to count the syllables, you might abstract the line as something like di-**da**-di-di-**da**-di-di-**da**, where each CV sequence represents a syllable and the stronger ones (the beats) have **da** while the weaker ones in between have di.

Ex 1.8 Continue identifying the stressed syllables in the limerick.

Ex 1.9 Identify the stresses in the following limerick (the second written by my students).

When doing transcription in phones

I tend to get lost on the tones.

The stress is quite clear –

Well, it is to my ear.

Thank goodness for Daniel Jones.

*(Daniel Jones, 1881–1967, was the founder of modern English phonetics and the first professor of phonetics in the University of London at UCL.)*

Ex 1.10 The limerick as a poetic form can be defined in terms of its rhymes and stress pattern. Use the data you have to explain the stress pattern of limericks.

Now, if we look again at the line itself and try to work out its CV-structure as was done in Exercise 1.5, we will find:

There	was	a	young	teach	er	of	sounds
CV	CVC	V	CVC	CVC-V(C)	VC	CVC(C)C	
di	<b>da</b>	di	di	<b>da</b>	di	di	<b>da</b>

Each one of the da's and di's lines up neatly with a single V in the real CV-structure which leads us to the idea: one vowel means one syllable. So, whatever still needs to be sorted out regarding the consonants (you will have noticed a couple of Cs with brackets round them), we can say that in English, this line has eight syllables. We can also say that three of them carry a rhythmic beat/stress. Phonetics has a special symbol for marking this prominence, called a **stress mark**. You will find it under Suprasegmentals on the IPA chart (page xiv) – a small raised vertical line – and this is placed immediately before the complete stressed syllable (not just the vowel, but also any consonants that satellite around it), giving: there 'was a young 'teacher of 'sounds.

Speakers of different languages perceive syllables differently, however. *Ice-cream*, which most native-speakers of English agree has two syllables (VC-CCVC), is often perceived by native-speakers of Japanese as having five! The same is true of the English seaside resort *Skegness* – two syllables for the average English holiday-maker, but five for a speaker of Japanese.

## 1.2 THREE TYPES OF PHONETICS

### 1.2.1 Articulatory phonetics

So far, we've been talking about speaking, saying words aloud, and thinking about how one word shares characteristics of pronunciation with another word, and so

forth. We have explored some of the confusions that abound in English spelling and we have discovered what a lot we already know about phonetics. If we delve a little more deeply into what phoneticians do with this knowledge, we will find that there are generally three different approaches that can be taken or three different ways in which we can look at a speech sound and at speech.

Describing how sounds are made is the business of **articulatory phonetics** which informs theories of **speech production**. We know a lot about this and such knowledge lies behind the organization of the IPA chart (page xiv). Learning all about the articulation of speech sounds can sometimes seem a rather daunting proposition. But if you bear in mind that all you are doing is learning about the movements made by the tongue and lips and a certain amount about the anatomy of the inside of the mouth and throat – the vocal tract – then that can help to keep it all in proportion ... it is a minute fraction of the knowledge you would need to be a doctor, for example!

Moreover, you will find that you already know some articulatory phonetics. What is necessary is to learn some new vocabulary in order to be able to verbalize your knowledge, and to become more aware of movements, gestures and feelings in your vocal tract that we otherwise take for granted.

**Ex 1.11**

1. Look in a mirror and repeat several times *ba-ba-ba...*, then *ma-ma-ma...*, then *pa-pa-pa...*. What can you see happening to make the consonant sounds [b], [p], [m]? Describe this.
2. Repeat the sequence *la-la-la* several times. You probably won't be able to see much this time, but think about what you can feel when you make the [l] sound. Describe this.
3. Go back to the sequences in 1 above. Gently pinch your nostrils and then say the three sequences again. Do you notice anything different? Try to describe what you notice.

Making accurate descriptions of the production of speech sounds can sometimes be done from first principles – extrapolating from our knowledge of the articulatory organs and linking this to what we can see, hear and/or feel. Sometimes, though, we may rely on physical measurements of one sort or another in order to clarify or confirm what we suspect is happening. A very useful account of such possibilities can be found in Ladefoged (2003).

Articulatory phonetics is the most widespread type of phonetics taught, underpinning both other types (acoustic and auditory), and is studied not only by linguistics students but also by students of speech and language therapy, many language students as well as some medical students, voice students, drama students, and students of singing, to name but a few.

### 1.2.2 Acoustic phonetics

One aspect of the instrumental measurements we can make of speech sounds is related to physics and involves measuring sound waves – the invisible part of speech, the disturbances in the air between us that are caused by the actions of the speaker

and which are picked up or heard by the ear of the listener. Acoustic measurements are often used to support articulatory and auditory judgements.

Acoustic measurements can be made fairly easily these days using a computer, microphone and freely downloadable software such as **WASP** or **Praat**. Such programs enable us to process recordings of speech and analyse the waveforms in great detail. The branch of phonetics that deals with the physical nature of speech sounds is called **acoustic phonetics** or the **physics of speech**.

**Ex 1.12** If you have a chance, download one of these programs from the internet and make a short recording (say *pa ba ma*, for example, from Exercise 1.12 or record your name) and then have a look at the different pictures the program can create. Look at the speech waveform, the wideband spectrogram, and the Fx or pitch track, for example. The URLs are:

1. for WASP: <http://www.phon.ucl.ac.uk/resource/sfs/wasp.htm>
2. for Praat: <http://www.fon.hum.uva.nl/praat/>

Many specialisms require knowledge of acoustic phonetics, from psychology through speech therapy and pronunciation training, to forensics. Increasingly today, interactive displays based on speech waveform analysis are being used in the classroom by language teachers to assist in fine-tuning pronunciation of foreign learners of languages (although, of course, all applications are also dependent on some knowledge of other types of phonetics as well).

### 1.2.3 Auditory phonetics

Listening to speech sounds and thinking about exactly what they sound like is something many phoneticians do routinely as part of their work. It can be called **auditory phonetics** and it underpins much of practical phonetic training or ear-training. This is useful because it also serves to remind us that speech isn't just something we produce but also something we hear and pay attention to, listen to. So phonetics is interested just as much in how we hear or perceive what is said as in how we say it in the first place. Another dimension of auditory phonetics is the study of **speech perception**.

In a linguistics degree, students might expect to undertake auditory phonetics in the form of ear-training, alongside production practice, learning to identify and make all the sounds of the IPA chart for themselves. This is useful for linguistics fieldwork, speech therapy, accent coaching, language teaching, and so on. In a psychology degree or an audiology degree, ear-training as such has little direct relevance and students tend to study the hearing mechanism (audiologists) and the effects of sounds on the brain (psychologists, neurologists, etc.); in such instances, it is the more theoretical dimension, the theory of speech perception, that is central.