CHAPTER **1**

Sounds of Language
['saʊ̯ndz əv 'læŋgwɪd͡ʒ]

In this chapter . . .

Welcome to the sounds of language. Most human languages are sound-based, and phonetics and phonology are the two sister sciences that investigate the role of the sound system in language and communication. In this textbook, you will explore the world of the smallest building blocks of language and how languages in general and English in particular make use of them.

In this chapter, we will look at the English writing system, why the Latin alphabet used by English and many other languages is not ideal, as it does not provide letters for all sounds, and what tools phoneticians have at their disposal to accurately write down the pronunciation of words. This textbook takes a hands-on approach. Therefore, in this chapter, you will also be introduced to a free software, *Praat*, used by many phoneticians. With this, you can listen to stretches of speech and annotate them. In Chapter 6, you will also learn how to perform simple measurements with it. Finally, just like there is standard English grammar and vocabulary, there are also two main pronunciation standards for English, which will be introduced here. Each chapter is going to finish with several exercises. These propose fun activities so that you can apply what you have learned.

1.1 Phonetics and Phonology
[fə'nɛtɪks ənd fə'nɒlɑd͡ʒi ‖ fə'nɛt̬ɪks ənd fə'nɑːlɑd͡ʒi]

Most human languages use sound as the medium for communication. Phonetics and phonology are two sister sciences that deal with the sound

structure of language. They both have similar and overlapping interests, but they focus on different aspects.

Phonetics is a natural science and has similar interests to biology, medicine or physics, for example. When we speak, different organs in our mouth and throat are set in motion. Articulatory phonetics describes what these processes are and how speech sounds are formed. With these speech organs, humans produce different sounds that have specific properties. Speech recognition systems, such as Alexa, Siri or Google Assistant, are able to measure and identify these sounds, and so can the human ear. Acoustic phonetics investigates the physical composition of speech sounds. While phonetics describes what happens in the body as we speak, phonology takes an interest in the mind.

Phonology is a discipline of linguistics that investigates the role of sounds within the system of language. Languages are like Lego systems, being made up of building blocks. Sentences consist of word groups, called 'phrases'. Phrases consist of words. Words can be split into smaller meaningful parts, so that *unlikely* can be analysed as *un-*|*like*|*-ly*. Phonology focuses on the smallest such parts: sounds. Not all languages use sounds in the same way. What counts as two different sounds for one language may be considered variations of the same sound for another. Segmental phonology seeks to establish the sound inventory of a language and how these sounds are distributed (i.e. where they can occur). Languages differ not only in which sounds they use, but also in which sounds can be combined with one another to form bigger units: syllables and words. Phonotactics describes which sound combinations are admissible. Furthermore, acoustic events bigger than individual speech sounds, such as speech rhythm and melody, may serve a communicative function. This is an interest of suprasegmental phonology.

1.2 Letters and Sounds

['lɛtəz ənd 'saʊ̯ndz ‖ 'lɛt̆ə̆z ənd 'saʊ̯ndz]

When dealing with spoken language, it is important to distinguish between letters and sounds. Letters are written; sounds are spoken. Naturally, there is a relationship between the two: written letters are intended to represent spoken sounds. However, in most languages – and especially so in English, which has historic spelling conventions that have not been adapted to newer sound changes for centuries – there is no one-to-one relationship between letters and sounds.

Many languages, including English, use the Latin alphabet. However, often the sound systems of these languages contain sounds for which the Latin alphabet does not provide a letter. For instance, consider the first

sound in the word *short*. English has solved this problem by using a combination of two letters: ‹sh›. This digraph stands for a different sound than the sounds represented by the individual letters ‹s› and ‹h›. Other languages opted for the same solution but chose different digraphs: the same sound is represented by ‹ch› in French, ‹sch› in German or ‹sc(i)› in Italian. In English, the digraph ‹th› similarly stands for a sound for which the Latin alphabet does not provide a letter. To be accurate, ‹th› can represent one of two sounds: the ‹th› in *thing* sounds different from the ‹th› in *this*.

Another major problem with orthographic spelling is the fact that the same letter may be pronounced in different ways: the ‹c› in *city* or *cell* is pronounced differently than in *code* or *clean*. The letter ‹e› represents a different vowel quality in each case in the words *dress*, *serve*, *before* and *ballet*. Also, the letter combination ‹ough› is associated with several entirely different sounds, as Table 1.1 illustrates.

Not only may the same letter be pronounced differently; also, conversely, the same sound or sound combination can be spelled in different ways. For instance, the first sound in the word *gin* is also found twice in *judge* but twice spelled differently, so that there are three different spellings ‹g›, ‹j› and ‹dg› for one and the same sound. If I asked you how you spell the [s] sound plus the vowel you hear in *fleece*, you would probably be at a loss. Table 1.2 gives you eleven different words with eleven different spellings for the sound combination.

Therefore, traditional spelling is not suitable for transcribing the pronunciation of words, and so linguists use a different writing system instead: the International Phonetic Alphabet (IPA).

Table 1.1 *Same letter combination corresponding to different sounds (reproduced from Finegan, 2015)*

cough	tough	bough	through	though	thoroughfare
‹ough›					
[ɒf ‖ ɔːf]	[ʌf]	[aʊ̯]	[uː]	[əʊ̯ ‖ oʊ̯]	[ə ‖ oʊ̯]

Table 1.2 *Different letter combinations corresponding to the same sounds (reproduced from Finegan, 2015)*

see	senile	sea	seize	scenic	siege	ceiling	cedar	cease	juicy	glossy
‹see›	‹se›	‹sea›	‹sei›	‹sce›	‹sie›	‹cei›	‹ce›	‹cea›	‹cy›	‹sy›
[siː]										

1.3 International Phonetic Alphabet

[ɪntə'næʃn̩əl fə'nɛtɪk 'ælfəbɛt ‖
ɪnt̬ə˞'næʃn̩əl fə'nɛt̬ɪk 'ælfəbɛt]

IPA is a transcription system for accurately writing down pronunciation. It is based on the Latin alphabet, which is practical for many speakers, as the Latin alphabet is widespread. However, IPA fixes many of its shortcomings, as there is a strict one-to-one correspondence between spoken sound and written symbol.

In IPA, the same sound is always represented by the same symbol. The first sound in the word *kind* is written [k] in IPA. But equally the words *clear* or *quick* will be transcribed with the same symbol [k] at the start, as they begin with the same sound.

Conversely, the same symbol will always stand for one and the same sound. For instance, the symbol [g] represents the first sound in the word *great*. If we wanted to transcribe the words *gel* or *genre*, we would use different symbols, as they begin with different sounds.

Table 1.3 gives you the IPA symbols used for the transcription of English. Subsequent chapters will explain the sounds they stand for in detail. Some sounds only exist in Standard British (SB) or General American (GA) pronunciation.

When transcribing in IPA:

- Put transcription in square brackets [. . .].
- Orthographic spelling can be signalled with ‹ . . . ›.
- Use no capital letters or punctuation.
- Write the symbols carefully: [ə] ≠ [ɘ], [ŋ] ≠ [ɳ], [ɪ] ≠ [ɪ̟], [θ] ≠ [ɵ], [aɪ̯] ≠ [ɑɪ̯].
- You can mark a stressed syllable with ['] and boundaries with [ǀ].

IPA Fonts

Using IPA symbols on a computer is easy. As a first step, you need to make sure that the font you are using is a Unicode font that contains IPA symbols. Luckily, more and more fonts are freely available that do.

Computers running on Microsoft Windows come with several fonts that contain IPA symbols. Additional ones can be downloaded free of charge. Figure 1.1 contains an extensive list of free IPA fonts. Go to the companion website of this textbook for the download links.

To install a new font on Windows, select the TTF or OTF files, right-click with your mouse and select ‘Install’ in the dropdown menu.

Table 1.3 *IPA symbols for English consonants and vowels (dark-shaded: weak and pre-rhotic vowels)*

p ***p**en*	b ***b**ack*	t ***t**ea*	d ***d**ay*	t͡ʃ ***ch**ain*	d͡ʒ *a**g**e*	k ***k**ey*	g ***g**et*
f ***f**ine*	v ***v**iew*	θ ***th**ing*	ð ***th**is*	s ***s**oon*	z ***z**ero*	ʃ ***sh**ip*	ʒ *vi**s**ion*
m ***m**ilk*	n ***n**ice*	ŋ *lo**ng***	l ***l**ight*	r ***r**oad*	j ***y**es*	w ***w**et*	h ***h**ot*

iː *fl**ee**ce*	i *happ**y***	ɪ *k**i**t*	ɪː SB *n**ear***	ʌ *str**u**t*	ʊ *f**oo**t*	u *sit**u**ation*	uː *g**oo**se*
ɛ *dr**e**ss*	ɛː SB *squ**ar**e*	ə ***a**go*	ɚ GA *lett**er***	ɜː SB *n**ur**se*	ɝː GA *n**ur**se*	ɒ SB *l**o**t*	ɔː *th**ough**t*
æ *tr**a**p*	eɪ̯ *f**a**ce*	aɪ̯ *pr**i**ce*	ɔɪ̯ *ch**oi**ce*	aʊ̯ *m**ou**th*	əʊ̯ SB *g**oa**t*	oʊ̯ GA *g**oa**t*	ɑː *p**a**lm*

Table 1.4 *Compose key sequences for IPA symbols in English*

ɑ	æ	ð	ə	ɚ	ɛ	ɜ	ɝ	g	ɪ	ŋ	ɔ	ʃ	θ	ʊ	ʌ	ʒ	ː	ˈ
a h	a e	d h	e e	e r	e h	⌫ e h	⌫ e r	g g	i h	n g	o)	s h	* u	u h	v v	z h	: +	| '

Download for Windows: www.wincompose.info

Arial	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Arimo	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Brill	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Calibri	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Cambria	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Cardo	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Charis SIL	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Consolas	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Courier New	[aɪɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
DejaVu Sans	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
DejaVu Serif	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Doulos SIL	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Erewhon	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Fira Sans	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Gentium Plus	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Heuristica	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Istok	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Judson	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Junicode	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Lato	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Linguistics Pro	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Linux Libertine	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Lucida Sans Unicode	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Noto Sans	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Noto Serif	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Segoe UI	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Source Sans 3	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
STIX	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Tahoma	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Times New Roman	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]
Tinos	[aɻɑæʌðɛəə˞ɜgɪɹɳɔɒʃʒθʊ]

Figure 1.1 Fonts containing IPA symbols

Typing on Desktop Computers and Laptops

Depending on how much text you wish to type in IPA and how regularly, there are different methods for typing IPA.

Find links to these and other resources:
cambridge.org/engphon

Compose Key

Compose key is a system designed for typing special characters, and it is ideal if you need IPA regularly but are not going to type entire texts. Compose key is mainly known from Linux, but you can also install it on Windows computers and other operating systems. To type an IPA symbol, you first press the compose key ⎄ (on Windows the [Alt Gr] key, to the right of the space bar). Then you enter a combination of two or more characters. These are usually intuitively chosen, so that you can easily remember them, such as ‹sh› for [ʃ] or ‹ng› for [ŋ]. In subsequent chapters as well as in the Appendix the compose key sequences will be given under ⎄.

Unicode Phonetic Keyboard

The Unicode Phonetic Keyboard is an additional keyboard driver for Windows, and it is ideal if you need to type longer texts. It adds an additional keyboard layout that you can switch to with the language selector in the lower right-hand corner of the screen, next to the clock. With this keyboard driver, Latin lower-case letters remain where they are on the keyboard. (The driver uses a QWERTY layout. If you have a QWERTZ or AZERTY keyboard, you need to look for some letters where they would appear on a QWERTY keyboard.) Upper-case letters, on the other hand, are replaced by IPA symbols, so that by typing ‘I U S Z T D’ the symbols ‘ɪ ʊ ʃ ʒ θ ð’ will appear on your screen.

Download for Windows: www.phon.ucl.ac.uk/resource/phonetics.php.
Other drivers for various operating systems: scripts.sil.org/UniIPAKeyboard.

IPA on Tablets and Smartphones

Android

One keyboard that supports typing in IPA is Gboard by Google. This may already be the default keyboard that your phone or tablet comes equipped with. If not, you can download it from Play Store and activate it in the settings.

Add ‘International Phonetic Alphabet’ as an additional language. (Search for ‘international’, as searching for ‘IPA’ will yield no results.) As a keyboard layout, you can select ‘QWERTY’ (normal keyboard layout; press long and swipe for IPA symbols) or ‘IPA chart’ (only IPA symbols, arranged by how the sounds are produced (manner of articulation)). To switch between keyboard layouts, hold down the space bar.

https://play.google.com/store/apps/details?id=com.google.android.inputmethod.latin

iOS: IPA Phonetic Keyboard

Install the app from the App Store. Click on the app for instructions on how to activate the keyboard layout in the settings. To change keyboards, press and hold the globe symbol.

https://apps.apple.com/app/ipa-phonetic-keyboard/id1440241497

Typing in Your Browser

In case you need a quick fix, perhaps because you do not have the time to install additional software or you lack the rights on the computer you are using, you can also type in your web browser and then cut and paste to the document where you need IPA transcription. On the website TypeIt, you can type a text by using your keyboard for symbols that correspond to Latin letters and type all other symbols by clicking them on the screen.

IPA symbols needed for English: https://ipa.typeit.org/
All IPA symbols: https://ipa.typeit.org/full/

IPA on Websites

Transcription symbols can also be used on websites and in blogs. To ensure that symbols are displayed correctly for the reader, the respective HTML entities should be used. A list of all IPA symbols with HTML entities and Unicode codepoints can be found in the Appendix.

X-SAMPA

Regular IPA symbols are special characters that were and sometimes still are challenging to implement in computer systems. Therefore, at the end of the 1980s a system was developed that allowed for writing IPA transcription using only ASCII characters: SAMPA (Speech Assessment Methods Phonetic Alphabet). The current version X-SAMPA is an extension devised by John Wells (cf. Wells, 2000), and it is still used today by phoneticians in situations where the use of special characters is not possible. In subsequent chapters and in the Appendix, the X-SAMPA

representation is given for each IPA symbol. You will probably never need X-SAMPA transcription, but if you ever do, you can use this book as a reference.

More about IPA symbols:

- Find all IPA symbols and the sounds they represent in the appendix.
► Appendix, page 197

1.4 Standard Pronunciation

['stændəd prənʌnsieɪ̯ʃn̩ ‖ 'stændə˞d prənʌnsieɪ̯ʃn̩]

Now that we know how to accurately write down pronunciation using IPA, the question remains as to which type of pronunciation we should transcribe, as there are many varieties of English spoken around the world.

The English language has a standard grammar and standard vocabulary. These are words and sentence structures that have been generally agreed upon and are widely understood. Standards are good, as they facilitate communication: if there is a way of expressing things that is common in your region, but only there, then you know that it is best to avoid this expression when speaking to someone from another place, as it might cause confusion. In such a situation, it is therefore better to use a standard expression instead. The same is true for pronunciation.

There are two major pronunciation standards. The one for American English is called General American (GA). The standard pronunciation for British English used to be called Received Pronunciation (RP). However, pronunciation in the British Isles has evolved over recent decades, and what used to be considered standard pronunciation today sounds archaic and overly posh. Therefore, it is better to avoid this term. Instead, you now often find the term 'Standard Southern British English' (SSBE). 'Southern British' is meant to refer to England here in contrast to Wales and Scotland. In this book, we are going to refer to the non-regional, generally accepted pronunciation standard simply as Standard British (SB).

The roots of SB lie in the south of England. Situated here are prestigious schools like Eton and the universities of Cambridge and Oxford. Students who attended these schools would ultimately speak with a similar accent, which came to be considered the most prestigious. When the BBC started broadcasting in 1922, it would initially only hire

speakers with such an accent. Hence, it was this pronunciation that was heard across the entire country.

Equally in the United States, it is the accent heard on radio and television that came to be recognized as the standard pronunciation. The origin of GA can be found in the region of the North Midlands and Midwest. While in England many speakers speak with a regional accent, in the United States more speakers have a pronunciation that is close to GA.

The transcriptions in this book are given in both SB and GA, in that order and separated by [‖]. If only one transcription is given, the word is pronounced identically in both standards.

More about differences between SB and GA:

- Several words have different vowels in SB and GA. ► Chapter 4.6, page 60
- When the letter ‹r› comes after a vowel, it is not pronounced in SB. ► Chapter 5.2, page 70
- T-tapping is a feature of GA. ► Chapter 7.7, page 105
- T-glottaling is widespread in British dialects. ► Chapter 7.7, page 105
- Sometimes, a different syllable is stressed in SB and GA. ► Chapter 11.7, page 158

1.5 *Praat*: Listening and Annotating

['prɑːt | 'lɪsn̩ɪŋ ənd 'ænə̯ʊteɪ̯tɪŋ ‖
'prɑːt | 'lɪsn̩ɪŋ ənd 'ænoʊ̯teɪ̯̆tɪŋ]

Praat is a free software used by many phoneticians, and it runs on Windows, Mac, Linux and other operating systems. Even if you do not intend to perform any measurements, it is a useful tool for listening to audio files and annotating them.

Starting *Praat*

Download *Praat* from www.praat.org. Unpack the file. It needs no installation. Start *Praat*. Two windows will open: 'Praat Objects' and 'Praat Picture'. Close 'Praat Picture'.

Opening a File

You can record a sound file with *Praat* by clicking 'New › Record mono/stereo Sound . . .'. If you wish to open an existing audio file, select 'Read from file . . .' in the 'Open' menu. If the file is too large to load into working memory completely (i.e. several hours long), select 'Open long sound file . . .' instead.