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# Phonetics and Phonology

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Recommended minimum reading time: 3 hours

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## Introduction

Phonetics and phonology are the components of Linguistics that are concerned with the sound structure of a language. **Phonetics** focuses on the physical properties of speech sounds, and it has three main branches, articulatory phonetics (the processes involved in the articulation of speech sounds), acoustic phonetics (the properties of the resulting sound wave that travels from the speaker to the listener) and auditory phonetics (the way the sound wave is heard and perceived by the listener). The focus of this unit will be on articulatory phonetics.

**Phonology** is concerned with the linguistic function of sounds, that is, whether a given sound is distinctive in a language. The basic unit of analysis in phonology is the **phoneme**.

### Example

Both English and Catalan/Spanish have the phonemes /p/ and /b/, as illustrated by the fact that in both languages there are pairs of words that are distinguished solely by the opposition between these two consonants (e.g., *pet* and *bet* in English, *pala* and *bala* in Catalan and Spanish).

However, as we will see, English and Catalan/Spanish differ in the specific phonetic properties of /p/ and /b/. The different realizations or variants of a given phoneme are called **allophones**.

### Example

English /p/ may be produced with or without aspiration, depending on the context. The aspirated ([p<sup>h</sup>]) and unaspirated ([p]) variants are allophones of the phoneme /p/.

Notice that phonemes are typically represented between slashes ("/ /"), while allophones are inserted between square brackets ("[ ]").

### See also

See the Section «Main allophonic variants».

A language's sound structure is not limited to the inventory of consonants and vowels in the language (**segmental structure**). Prosodic structure such as stress, rhythm and intonation (**suprasegmental structure**) is also a crucial component of a given sound system. In this unit we will describe the main characteristics of the English segmental and suprasegmental structures, and we will compare them to the sound systems of Catalan and Spanish. The segmental structure will be presented first, followed by an overview of the suprasegmental structure. More in-depth descriptions of the English as well as the Catalan and Spanish sound systems are provided in the bibliography.

## Objectives

After having worked through this unit, students will be able to:

1. Understand basic and crucial notions in phonetics and phonology, necessary to describe and compare different systems.
2. Describe the consonant and vowel systems of English, and contrast them to the Catalan/Spanish systems.
3. Be familiar with the main differences in word stress, sentence stress, rhythm and intonation between English and Catalan/Spanish.
4. Be aware of some of the most common phonotactic characteristics and connected speech processes in English.
5. Identify differences and similarities between the English and the Catalan and Spanish sound systems, illustrate them with examples, and take them into account in their own pronunciation of English.

## 1. Segmental structure

The segmental structure of a language refers to the inventory of consonant and vowel sounds. Consonants are produced with varying degrees of obstruction of the air while vowels are produced without a major obstruction of the air in the vocal tract.

### Note

We use phonetic symbols to refer to the sounds of the language described. The most common system of phonetic transcription, and the one used in this unit, is the International Phonetic Alphabet (IPA), created in 1888 and revised on numerous occasions, most recently in 2015. You can learn more about the IPA from the IPA Association website.

Remember to distinguish letter from sound. In many languages including English there is not a one-to-one correspondence between letters and sounds. A single sound may be spelled in different ways (e.g., /s/ as <s, c, ss, sc>). One letter may also represent different sounds in different words (e.g. letter <a> in *cat*, *cake*, *many*, *call*, *ago*). Thus, when describing vowels and consonants we will refer to the sounds, and we will represent them with phonetic symbols, not letters.

### 1.1. English consonants

Many of the consonants of English have a counterpart in Catalan and Spanish. Still, there are a number of differences involving the existence of certain consonants in a given language and the specific variants of shared consonants. We will first describe and compare the consonant phonemic inventories of all three languages and afterwards we will focus on the most crucial allophonic pronunciations.

#### 1.1.1. Consonant phoneme inventories

A list of the 24 English consonant phonemes is presented in Table 1, with examples of words that contain each of the consonants. Table 2 presents the English phonemes alongside the consonant inventories of Catalan and Spanish. As is customary, the consonants in Table 2 appear organized by place of articulation (columns) and manner of articulation, that is, degree of obstruction of the air in the production of the consonants (rows). Within a cell, symbols on the left represent voiceless sounds, produced without vibration of the vocal chords, and symbols on the right represent voiced sounds, produced with vibration of the vocal chords.

Two words that differ only in one sound are referred to as a **minimal pair**. They constitute evidence that the sounds in question belong to different **phonemes** (e.g., /p/ and /b/ in *pay-bay*, /f/ and /v/ in *fan-van*).

Table 1. English consonants and examples

Consonant	Example	Consonant	Example	Consonant	Example	Consonant	Example
/p/	pay	/f/	fan	/ʃ/	sheep	/m/	may
/b/	bay	/v/	van	/ʒ/	measure	/n/	now
/t/	tie	/θ/	think	/tʃ/	chin	/ŋ/	long
/d/	die	/ð/	there	/dʒ/	gin	/j/	yet
/k/	key	/s/	sue	/h/	hot	/w/	wet
/g/	guy	/z/	zoo	/l/	lot	/ɹ/	row

The main differences between the English sound systems and the Spanish and Catalan sounds systems are the following:

- English /t/ and /d/ are **alveolar**, articulated with the tip of the tongue touching the alveolar ridge (the bump behind the upper teeth). By contrast, in Spanish and Catalan /t/ and /d/ are **dental**, articulated at the teeth.
- English and Catalan share a number of voiced and voiceless **fricatives** and **affricates**, but Standard Iberian Spanish lacks the fricative /ʃ/ and the voiced fricatives and affricates (/z, ʒ, dʒ/). Some varieties of Spanish have a voiced palatal fricative (/j/) corresponding to orthographic <ll> and <y>, but this sound varies considerably from a glide /j/ to a fricative or even a stop (/ʃ/) depending on the variety (Hualde, 2005). Still, voiced variants of the voiceless fricatives may appear preceding a voiced consonant (e.g., *mismo*: mi[z]mo, *desde*: de[z]de).
- Spanish and most varieties of Catalan lack the phoneme /v/. Spanish has the phoneme /x/ (e.g., the <j> in *rojo*), not found in English. English has the glottal fricative /h/, not found in Catalan, but found in some varieties of Spanish instead of /x/.
- The voiceless dental fricative /θ/ is found in English and Spanish, but not in Catalan. The voiced dental fricative /ð/ is not found in Spanish or Catalan as a separate phoneme. A similar sound, the **voiced dental approximant** [ð̞], is found in Catalan and Spanish as a variant, or allophone, of /d/ in some contexts (e.g., between vowels as in *vida*: við̞a).



In English, however, /ð/ is a separate phoneme, as illustrated by the presence of minimal pairs like *day-they* or *breeding-breathing*.

- English does not have the **palatal consonants** /ʎ/ and /ɲ/ found in Catalan (e.g. *gall, Espanya*) and standard Spanish (e.g. *gallo, España*). Spanish does not have a velar nasal phoneme (/ŋ/) although this sound is present as a variant of /n/ before a velar consonant (e.g., *cinco*:/θiŋko/) and word finally in some varieties. Catalan has some minimal pairs involving /ɲ/, like *sant* /san/ - *sang* /saŋ/.
- Catalan and Spanish have two **rhotic sounds**, a rolled or trilled /r/ as in *mirra* and a tap /ɾ/ as in *mira*. In English, the rhotic is a retroflex post-alveolar approximant, produced with the tip of the tongue curled up and back towards the rear edge of the alveolar (see Rogers, 2000, for further details). Notice that in some English varieties like Standard Southern British English (SSBE), /ɾ/ is not pronounced postvocally, unless another vowel follows. In other varieties referred to as **rhotic varieties**, such as General American, Irish or Scottish English, /ɾ/ is always pronounced. Thus, *nurse* is pronounced /nɜ:s/ in non-rhotic varieties like SSBE, and /nɜ:ɾs/ in rhotic varieties like GA.

**Note**

Notice that some common sounds have very different spellings across languages. For example, the English fricative /ʒ/ (Catalan <j> or <g>, as in *roja, Joan, gespa*) usually corresponds to a single <s> between vowels in words that end in *-sion, -sure*, such as *illusion, treasure*, while the affricate /dʒ/ (Catalan <tg> or <tj> as in *metge, mitja*) is generally spelled with <g> or <j> as in *jelly, gym, magic*.

Table 2. English (E), Catalan (C) and Spanish (S) consonant phonemes (adapted from Finch & Ortiz Lira, 1982; Recasens, 1984).

		Bilabial	Labiodental	Dental	Alveolar	Post-alveolar	Palato-alveolar	Palatal	Velar	Labial-velar	Glottal
Stop	E	p b			t d				k g		
	C	p b		t d					k g		
	S	p b		t d					k g		
Affricate	E						tʃ dʒ				
	C						tʃ dʒ				
	S						tʃ				
Fricative	E		f v	θ ð	s z		ʃ ʒ				h
	C		f		s z		ʃ ʒ				
	S		f	θ	s			(j)	x		

**Note**  
/ɹ/ is an approximant, /r/ is a trill and /ɾ/ is a tap (see main text).

<b>Nasal</b>	E	m			n				ɲ	
	C	m			n			ɲ	ɲ	
	S	m			n			ɲ		
<b>Lateral</b>	E				l					
	C				l			ʎ		
	S				l			ʎ		
<b>Rhotic</b>	E					ɾ				
	C				r /r					
	S				r /r					
<b>Glides</b>	E							j		w
	C							j		w
	S							j		w

### 1.1.2. Main allophonic variants

One of the main differences between English and Spanish/Catalan involves the different realizations of the stops (/p t k/ and /b d g/). One important characteristic of English stops is aspiration. **Aspiration** affects voiceless stops and involves a delay in the onset of voicing in the sound that follows the stop. In Standard Spanish and Catalan, stops are never aspirated and the vowel or approximant following a voiceless stop is fully voiced. By contrast, in English a period of voicelessness follows the aspirated voiceless stop due to the delay in the onset of vocal chord vibration. Aspiration is perceived as a puff of air following the release of the stop. In phonetic transcription, aspiration can be represented with a superscript h ([p<sup>h</sup> t<sup>h</sup> k<sup>h</sup>]). English stops are aspirated when they are found at the beginning of a stressed syllable, except when they follow an /s/. Hence the p in *pain* is aspirated but the p in *Spain* is not.

Regarding the **voiced stops**, Spanish and Catalan /b d g/ are articulated with incomplete closure when they are found in intervocalic position (more specifically, when found between continuant sounds), but with complete closure after a pause or a nasal consonant. Thus, in the sequence *la bomba*, the first /b/ is an approximant sound ([β]) and the second /b/ is a stop ([b]). Similarly, the /g/ in *llaga* is an approximant ([ɣ]) while the /g/ in *tango* is a stop ([g]). In English, /b d g/ are always stops and are not weakened to approximants (see the previous section for the opposition between English /d/ and /ð/).

In terms of voicing, the **English voiced obstruents** (that is, stops, affricates and fricatives) are fully voiced only when found between voiced sounds, otherwise they tend to be partially devoiced. In fact, an important cue to the

voicing nature of a final consonant is often the duration of the preceding vowel, which is shorter before a voiceless consonant (e.g., in *rip*, *bat*, *back*, *bus*, and *rich*) than before a voiced consonant (e.g., *rib*, *bad*, *bag*, *buzz*, and *ridge*).

In Catalan, the opposition between voiced and voiceless obstruents is lost or neutralized in final position. Hence, final obstruents are voiceless before a pause and before a voiceless consonant (*do[s]* *cotxes*, *do[s]* *trens*, *en tinc do[s]*). On the other hand, all word-final obstruents are voiced before a voiced consonant (*do[z]* *dies*, *ca[b]* *dia*), and word-final fricatives and affricates are also voiced before a vowel (*do[z]* *arbres*). This is known as **regressive voicing assimilation** (RVA). In Spanish, RVA may also be found preceding a voiced consonant (*i[z]* *lla*) but word final consonants are uncommon and they tend to undergo lenition or weakening processes, that is, they are produced with a greater degree of opening or even disappear (e.g. *ciudad*: *ciuda[ð]*, *ciudâ*).

In English, syllable-final /l/ is **velarized**, also known as dark l, that is, produced with the back of the tongue raised towards the velum or hard palate. This is also found in Catalan, but it is not common in Spanish. In fact, this is a typical trait of Catalan-accented Spanish, e.g., the pronunciation of the l in *muy mal*.

## 1.2. English vowels

English has between 10 and 12 vowel phonemes, depending on the variety. The vowels and diphthongs of **Standard Southern British English** (SSBE) are exemplified in Table 3, which includes examples of words containing each vowel. Figure 1 shows the usual representation of the SSBE vowel system, where vowels are organized in terms of position of the highest point of the tongue (front, central and back) and degree of opening of the mouth (from close to open). The Central or Eastern Catalan inventory has 7 vowel phonemes, namely /i e ε a ɔ o u/ (*nít*, *nét*, *net*, *nat*, *ós*, *os*, *us*) and the unstressed vowel [ə] (although it is a phoneme in Majorcan Catalan found in stressed position). The Spanish vowel inventory consists of 5 vowels (/i e a o u/, as in *pisó*, *peso*, *paso*, *poso*, *puso*).

### Note

RVA should be avoided when speaking English. For example, *This is true* should be pronounced *Thi[s] is true*, not *Thi[z] is true* as this ends in /s/; by contrast, *These are nice* is pronounced with [z] as *these* ends in [z].

Figure 1. English vowel phonemes (Standard Southern British English)

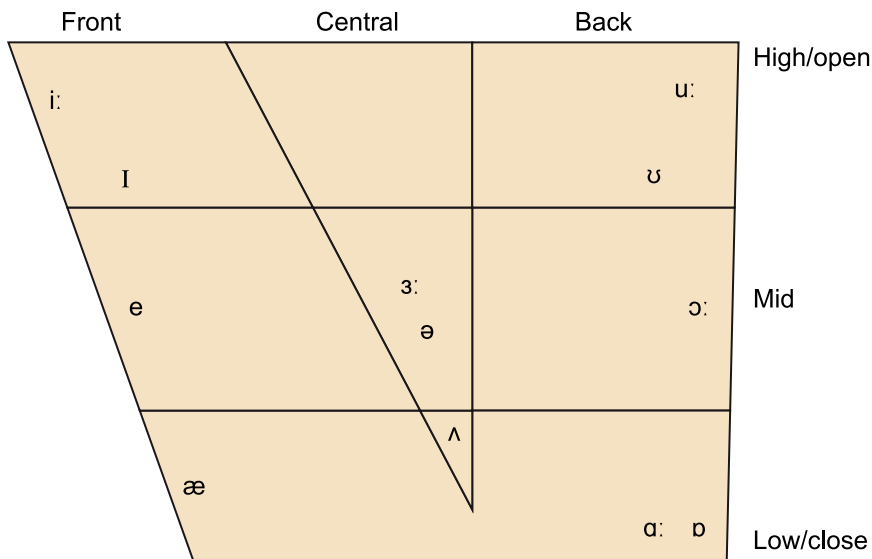


Table 3. English vowels and diphthongs and examples

Vowel/ Diphthong	Example	Vowel/ Diphthong	Example	Vowel/ Diphthong	Example	Vowel/ Diphthong	Example
/i:/	sea	/ɒ/	lot	/ɜ:/	bird	/aʊ/	now
/ɪ/	sit	/ɔ:/	four	/ə/	ago, sofa	/ɔɪ/	boy
/e/ (/ɛ/)	set	/ʊ/	put	/eɪ/	pay	/ɪə/	here
/æ/	map	/u:/	boot	/əʊ/ (/oʊ/)	go	/eə/	care
/ɑ:/	farm	/ʌ/	fun	/aɪ/	pie	/ʊə/	cure

The symbols /ɛ/ and /oʊ/ in Table 3 are alternatives used for example to describe General American English (GA). Other differences between SSBE and GA are:

- The unrounding of /ɒ/ (e.g., *hot* pronounced /hat/).
- Rhoticity, that is, the pronunciation of post-vocalic /r/ in GA and its effect on the preceding vowel.
- The loss of the glide in the sequence /ju:/ in some contexts (e.g., st[u]dent vs. st[ju]dent).
- The pronunciation of specific lexical items, e.g., *glass*, *ask*, *dance*, *bath*, *laugh* pronounced with /ɑ:/ in SSBE, /æ/ in GA.

The main differences between the English and the Spanish/Catalan vowel systems are the following:

- Unlike Catalan and Spanish, English has **long** and **short** vowels. Long vowels are indicated with the diacritic ":". Thus, the vowels /i: a: ɔ: ɜ: u:/ typically have a longer duration than /ɪ e æ ʌ ɒ ʊ/. Notice however that the difference between these vowels is not simply a matter of duration. For example, /i:/ and /u:/ are longer but also closer and more peripheral in the vowel space than their shorter counterparts /ɪ/ and /ʊ/, which are produced with a greater opening of the mouth. It is therefore more common to refer to this opposition as **tense** (e.g. /i: u:/) and **lax** (/ɪ ʊ/) vowels. In addition, not all lax vowels are equally short. For instance, vowel /æ/ tends to be longer than vowel /ʌ/. An additional difference between tense and lax vowels is that stressed lax vowels are always followed by a consonant (e.g., *bit, bet, bat, but, put, hot*). Only tense vowels (and diphthongs) can be found in a stressed open syllable (e.g., *bee, blue, spa, law*), but they can also be followed by a consonant (e.g. *beat, boot, start, horse*).
- While Catalan and Spanish have one low or open vowel (/a/: open central unrounded vowel), English has three unrounded **open vowels** (/æ ʌ a:/). This difference poses a problem for Catalan/Spanish learners of English. Notice that /æ/ is articulated at the front of the mouth, /a:/ is articulated at the back of the mouth, and /ʌ/ is central and more close and it is comparatively shorter.
- Like Catalan, English has a reduced vowel, often referred to as a neutral vowel or **schwa** (/ə/), which is always found in unstressed position. **Vowel reduction** is in fact a key characteristic of English pronunciation as unstressed syllables and function words are often pronounced with a reduced vowel, e.g., the highlighted syllables in *standard, accurate, reason, actor, surprise, abandon, circus, famous, pattern*. Unlike most Catalan varieties (except Majorcan Catalan), English has a mid central vowel that can be stressed (/ɜ:/). This vowel is often followed by <r> as in the following examples: *sir, bird, hurt, occur, earth, serve, work*. Spanish has neither a stressed nor an unstressed mid central vowel and has no vowel reduction process.
- The English **diphthongs** (/aɪ eɪ ɔɪ əʊ əʊ/) are relatively similar to their Catalan and Spanish counterparts (e.g., /aj ej oj əʊ oʊ/, but notice the more central starting point of SSBE /əʊ/). Still, the pronunciation of the English diphthongs varies considerably depending on the dialect (cf. Cockney English, Australian English). In addition, English has centering diphthongs that glide into /ə/, namely /eə ɪə ʊə/, as in *care, here, poor*, not present in Spanish or Catalan.
- Recall from the previous section that the voicing nature of a final consonant affects the duration of the preceding vowel in English. This is known as **pre-fortis clipping**, which means that a vowel is clipped, or shortened, before a voiceless consonant. For example, the vowels and

diphthongs in *leaf*, *kit*, *bet*, *duck*, *rope* and *rice*, all ending in a voiceless consonant, are shorter than the ones in *leave*, *kid*, *bed*, *dug*, *robe* and *rise*, respectively, which end in a voiced consonant.

### 1.3. Phonotactics

Languages also differ in the possible combination of sounds that they allow. This is known as **phonotactics**. For example, English allows more consonants in a sequence (**consonant clusters**) than Catalan, which in turn has more clusters than Spanish. Hence, English can have up to three consonants in word-initial position (*pay*, *pray*, *spray*), while Spanish and Catalan can have a maximum of two (*tren*, *placa*). The English 3-consonant sequences always start with /s/, e.g., *scratch*, *splash*, *strange*. In fact, this is one of the main phonotactic differences between English and Catalan/Spanish, as sequences of /s/+C (where C = consonant) are not possible in Catalan and Spanish, which instead require the presence of a vowel before the s+C cluster (e.g., *study* vs. *estudiar*, *special* vs. *especial*). Notice that English borrowings involving s+C clusters are adapted into Catalan and Spanish precisely by adding a supporting vowel (*eslang*, *esnob*). Catalan/Spanish learners of English should aim to produce the /s/+C clusters in English without adding an initial vowel.

Regarding **final clusters**, English allows from one to four consonants in final position (*mad* /d/, *act* /kt/, *next* /kst/, *sculpt* /lpt/, *texts* /ksts/, *sixths* /ksθs/). Many clusters result from the addition of an inflectional ending (e.g., *lamps* /mps/, *asks* /sk/, *sends* /ndz/, *passed* /st/, *lived* /vd/, *thanked* /ŋkt/, *glimpsed* /mpst/). Catalan allows a variety of CC clusters (e.g., *porc*, *art*, *palc*, *cost*, *serp*, *basc*, *trionf*) and CCC clusters often involve a final plural s (e.g., *amargs*, *cascs*, *forns*, *golfs*; but *text*). Longer clusters are infrequent and may be reduced or broken (e.g., *texts-textos*), and the pronunciation of the final consonant is often omitted, for example after nasals or /l/ (e.g., *alt*, *vent*, *camp*). There are no consonant clusters in final position in native Spanish words.

#### Note

The pronunciation of the regular **past tense** or **past participle morphemes**, spelled *-ed*, depends on the voicing nature of the last sound in the verb stem. Thus, *-ed* is pronounced /d/ when the last sound in the stem is voiced (e.g., *loved* [lʌvd], *killed* [kɪld], *lied* [laɪd], *studied* [stʌdɪd]), /t/ when it follows a voiceless sound (e.g., *kissed* [kɪst], *talked* [tɔːkt], *watched* [wɒtʃt], *attacked* [ətækkt]) and /ɪd/ or /əd/ when the last sound in the stem is a /t/ or a /d/ (*waited* [weɪtəd], *added* [ædəd], *folded* [fəʊldəd], *attracted* [ətɹæktəd]).

In terms of the type of possible combinations, the structure of the syllables in all three languages follows for the most part from the **sonority principle**. In general the more open the articulation of a sound, the more sonorous it is. Thus, in terms of decreasing sonority, a sonority hierarchy can be established as follows: vowels > glides > liquids (laterals and rhotics) > nasals > fricatives > stops. According to this principle, elements in a syllable will be organized so that the closer to the nucleus of the syllable the greater the sonority. Vowels are

thus the most common element in the nucleus of a syllable. Within consonant clusters, nasals and approximants tend to be closer to the nucleus and stops and fricatives tend to be closer to the syllable margin. This is the reason why we have initial clusters like *pl-* and *tr-* but not *lp-* and *rt-*.

This principle accounts for most initial and final combinations in English, Catalan and Spanish. There are some combinations, however, that are found only in English, such as /ʃɪ-/ in *shroud*, *shriek* or /θɪ-/ in *throw*, *thrive*. Also, while in Catalan and Spanish only vowels can be found in the nucleus of a syllable, in English nasals and liquids can be in the nucleus, in which case they are referred to as syllabic consonants (e.g., *table* /teɪb l̩/ and *sudden* /sʌd n̩/ where /l̩/ and /n̩/ indicate syllabic l and syllabic n, respectively).

## 2. Suprasegmental structure

**Suprasegmental** phenomena are those aspects of the sound structure of a language that extend over more than one sound or segment, such as stress, rhythm, and intonation. These are commonly referred to as **prosody**.

### 2.1. Stress

**Stress** or accent is related to the perceived prominence of a syllable in relation to neighbouring syllables. Stressed syllables are associated with at least some of the following characteristics: a higher **pitch** or pitch change initiation, a longer duration, a greater intensity or loudness and the presence of a full vowel in the syllable nucleus. By contrast, unstressed syllables may tend to involve lower pitch, shorter duration, lower intensity and the presence of reduced vowels. Following IPA conventions, we will indicate stress with a high stroke preceding the stressed syllable ('). A lower stroke (,) represents a secondary stress, e.g. ,*under*'*stand*.

#### Pitch

Pitch is a perceptual property of sound that allows us to perceive for instance the difference between two notes on a musical scale. It is related to frequency, which is a physical property of sound that, in speech, is determined by the rate of vibration of the vocal chords: the faster the vibration, the greater the frequency.

#### 2.1.1. Word stress

In English, Catalan and Spanish word stress is not fixed but may fall on one of several syllables, which are usually either the last syllable (ultimate), the one before last (penultimate) or two before last (antepenultimate). Antepenultimate stress is more common in English than in Catalan/Spanish. In fact, earlier syllables may also carry stress in English (e.g., *in*'*evitable*, '*helicopter*, '*accuracy*). This is uncommon in Spanish and Catalan, except in sequences of verb + clitics such as *porta-me-la* or *llévate los*. Further, in words of 3 or more syllables, in English there is a greater tendency for stress to fall early on in the word than in Catalan/Spanish, as illustrated by the following cognate words:

'improvise – improvi'sar

'calculator – calcula'dora

'architecture – arquitec'tura

di'plomacy – diplo'màcia /diplo'macia

'complicated – compli'cada

'comfortable – comfor'table /confor'table



It is not always possible to predict the stressed syllable in a word, but there are some general tendencies. In English, most two-syllable nouns are stressed on the penultimate syllable (e.g., 'pencil, 'velvet, 'elbow), and most two-syllable verbs are stress-final (e.g., be'gin, o'bey, for'get). Still, there are some stress-final nouns (e.g., ma'chine, be'lief) and stress-initial verbs (e.g., 'conquer, 'sharpen). Some words have more than one possible stress pattern, e.g., the word *adult* can be pronounced a'dult or 'adult. In some cases, this variation represents the pronunciation of different varieties of English.

### Example

SSBE: ad'dress, cigə'rette, 'ballet, 'garage, la'boratory

GA: 'address, 'cigarette, bal'let, ga'rage, 'laboratory

There are different **levels of prominence** in English. Stressed syllables may have primary stress or secondary stress, and unstressed syllables may be completely unaccented (e.g., 'corner) or have some prominence (e.g., 'dynamite). Secondary stress (,) is found in longer morphologically complex words that have a prominent syllable in addition to the main stress (e.g., ,thir'teen, ,un'friendly, ,after'noon, ,Japa'nese) and stress may be shifted from the primary to the secondary when followed by a stress-initial word (,thir'teen → 'thirteen 'days, ,Japa'nese → 'Japanese 'student).

While in Spanish and Catalan derivational **suffixes** are typically stressed (e.g. na'ció/na'ción – nacio'nal – nacionali'tat/nacionali'dad), only a few suffixes are stressed in English (e.g., 'picture – pictu'resque, 'refuge – refug'ee, Ja'pan – ,Japa'nese); most suffixes either have no effect on the stress pattern of the original word ('nation – 'national, 'wonder – 'wonderful, 'lazy – 'laziness) or they shift the stress within the original word (ad'vantage – advan'tageous, 'photograph – pho'tography – photo'graphic).

There is a close relationship between stress and vowel quality in English. Stressed syllables contain a full vowel or a diphthong (/i: ɪ eɪ ε æ aɪ ʌ ɜ: u: ʊ ɔ: ɒ a: əʊ əʊ ɪə eə ʊə/), while unstressed syllables often have a reduced vowel (/ɪ ʊ ə/), as in 'limit, 'pencil, 'accurate, 'corner. Nevertheless, unstressed syllables may sometimes contain a full vowel (e.g., 'elbow, 'protein, car'toon, 'dynamite), and vowels /ɪ/ and /ʊ/ can be stressed ('limit, 'sugar).

Stress affects the pronunciation of the vowel sounds in multisyllabic words to the extent that the same syllable may be pronounced with a full vowel or a reduced vowel depending on the position of stress. Notice for instance the pronunciation of the stressed and unstressed vowels in the following pairs of related words: *Canada* /'kænədə/ - *Canadian* /kə'neɪdɪən/, *photograph* /'fəʊtəgræf/ - *photography* /fə'tɒɡrəfi/. This is related to the process of **vowel**

**reduction** in unstressed syllables explained in the Section «English vowels». Vowel reduction is also found in Catalan (*casa* /'kazə/ - *caseta* /kə'zɛtə/), but not in Spanish.

Remember that by definition the neutral vowel /ə/, commonly known as **schwa**, is only found in unstressed syllables (e.g. the highlighted vowels in *a*'go, 'sofa, *a*'nother, con'fusion).

### 2.1.2. Contrastive stress

Stress in English can be **contrastive** at the lexical level, that is, stress can distinguish words made up of the same sequence of sounds, as in 'reefer and re'fer in GA. This is not unique to English, as we can find some examples in Spanish (*célebre* – *celebre* – *celebré*, *hábito* – *habito* – *habitó*) and Catalan (*cosí* – *куси*, *ajupir* – *ajupi*). In English, contrastive stress often involves verb-noun/ adjective pairs, where the verb pattern is stress-final and the noun or adjective pattern is stress-initial: *to in'sult* – *an 'insult*, *to in'crease* – *an 'increase*, *to per'mit* – *a 'permit*, *to ab'stract* – *an 'abstract* – *'abstract painting*.

Other forms of contrastive stress are more specific to English. For instance, long established **compound words** tend to have a different stress pattern from sequences of adjectives and nouns.

#### Example

In the sentence *The White House is a white house*, the compound is stressed only on the first element ('White House) but the both words are stressed in the sequence 'white 'house. Similar examples are 'blackboard and 'black 'board, 'greenhouse and 'green 'house.

Notice also that **phrasal verbs** are stressed on both the verb and the preposition (*to 'hand 'out*, *to 'take 'off*), but in the corresponding nouns there is only one stress (*a 'hand-out*, *a 'take-off*).

## 2.2. Sentence stress and rhythm

When we produce sentences in speech, some words stand out with respect to others, that is, some words are stressed while others are unstressed. The distribution of stresses in a sentence is not fixed, but it tends to obey some general principles. Stress tends to fall on words that convey important meaning. Typically, these words are **content words**, that is, nouns, main verbs, adjectives and adverbs. By contrast **function words** tend to be unstressed (e.g., determiners, prepositions, auxiliary verbs, pronouns, conjunctions). For example:

A 'German 'tourist 'asked me for di'rections on 'how to 'get to the ca'thedral by 'bus.

This general pattern may vary for several reasons. A few function words, such as demonstratives, possessive pronouns, interrogatives and negative auxiliaries, tend to be stressed. Some content words that do not carry much meaning, such as *thing*, *stuff*, or *place*, are generally unaccented. In addition, words that are generally unstressed may be stressed to indicate contrast or emphasis, as discussed in the Section «Focussing and tonicity».

### 2.2.1. English rhythm

The distribution of stresses in a sentence or utterance is linked to the rhythm of speech. Rhythm is related to the presence of beats at relatively regular intervals of time. Depending on what constitutes the beats, languages are classified as stress-timed or syllable-timed. In **stressed-timed languages** rhythm is determined by the alternation of stressed syllables, which act as rhythmic beats and occur at regular intervals of time. In contrast, in **syllable-timed languages** in principle all syllables contribute to the rhythm and syllables occur at regular intervals of time. The main differences between stress-timed and syllable-timed languages are outlined in Table 4:

Table 4. Characteristics of stress-timed and syllable-timed languages (based on Solé, 1991)

	<b>Stress timed</b>	<b>Syllable timed</b>
<b>Vowel reduction</b>	Strong	Weak or not present
<b>Syllable structure</b>	Complex, presence of C clusters	Simple, preference for CV o CVC structures
<b>Secondary stress</b>	Crucial, prevents long sequences of unstressed syllables	Not crucial
<b>Metrical system</b>	Based on the position of stress and number of stressed syllables	Based on the total number of syllables (stressed and unstressed)

Thus, English is described as a stress-timed language, while Spanish is classified as a syllable timed language. Catalan has some of the characteristics of stressed timed languages (vowel reduction, more complex syllable structure) but to a lesser extent than English. Hence, Catalan is often classified as a syllable-timed language.

#### Example

The difference in duration between stressed and unstressed syllables is much greater in English than in Catalan (Prieto *et al.*, 2012).

English rhythm is based on the alternation between stressed and unstressed syllables, and stressed syllables tend to occur at regular intervals of time, what is referred to as **isochrony**. This implies that the intervals between stressed syllables have a similar duration, regardless of the number of unstressed syllables present.



Word	Strong form	Weak form	Weak form in context
her	hɜ:(ɪ)	hə(ɪ), ə(ɪ)	Her husband is looking for her.
that (conjunction / relative pronoun)	ðæt	ðət	I think that the one that you got is better.
there	ðeə(ɪ)	ðə(ɪ)	There was nobody around.
at	æt	ət	Look at this picture.
for	fɔ:(ɪ)	fə(ɪ)	I'm waiting for the bus.
from	fɪɒm	fɪəm	They just came back from Paris.
of	ɒv, ʌv	əv, ə	Have a piece of cake.
to	tu:	tə, tʊ	She wanted to tell you.
do (auxiliary)	du:	də, dʊ	What do you want to do?
am	æm	əm, m	I'm not interested.
is	ɪz	z	He's standing outside.
are	ɑ:(ɪ)	ə(ɪ)	These are mine.
was	wɒz	wəz	She was asking about you.
were	wɜ:(ɪ)	wə(ɪ)	There were.
will	wɪl	l	I'll see you later
can	kæn	kən	Let me know what I can do.
have (auxiliary)	hæv	həv, əv, v	They must have missed the train.
has (auxiliary)	hæz	həz, əz, z	He has been in London before.
had (auxiliary)	hæd	həd, əd, d	We had already told you.
would	wʊd	wəd, d	I would like some tea, please.

A single strong form may have one or more weak forms, like *have* or *and*. The function words involved in this strong-weak alternation include prepositions, auxiliary verbs, determiners, conjunctions and pronouns. Notice that while the contractions used in orthography reflect weak form pronunciations (e.g., *'ll*, *'ve*, *'d*, *'s*), very often the use of weak forms is not reflected in the spelling.

The strong forms are used in the following cases:

- **Citation** form: How do you say “at” in German?
- In cases of **stranding**, when a preposition or an auxiliary is at the end of a phrase: Is this what you are looking **for**? Yes, it **is**.
- When **contrasted** with another word: I didn't see **her**, but I saw **him**.

- When stressed for **emphasis**: You **must** tell me the truth.

In addition, the strong form is used with negative auxiliaries in contractions with *not* (e.g., *aren't*, *mustn't*, *can't*, *haven't*).

The **usual pronunciation** of most function words is the **weak form**. This is not an optional pronunciation but the correct pronunciation when none of the conditions of the use of strong forms is met. Learners should thus avoid pronouncing a strong form in place of a weak form.

Function words like determiners, prepositions and pronouns tend to be unstressed in Catalan and Spanish, may have a reduced vowel in Catalan, and are typically contracted next to a vowel in Catalan (*l'àvia* vs. *la nena*, *mira'm* vs. *mirar-me*). Still, there is not generally a strong and weak version of each word in Catalan/Spanish, except some cases of emphatic pronouns, such as the unaccented *me* and the accented *mí*, e.g., Spanish *dámelo a mí*.

### 2.3. Intonation

**Intonation** has been described as the melody of speech and it is determined by pitch changes, that is, the rises and falls of the pitch of the voice over time in an utterance. Speakers use this variation in pitch to convey linguistic information (delimiting grammatical structures, distinguishing between statements and questions) and pragmatic information (expressing attitudes or emotions like surprise, fear, anger or excitement). Some of functions of intonation are shared by English, Catalan and Spanish, although they are not always used in the same fashion.

We will focus on three aspects of intonation, known as the three Ts:

- **Tonality.** How an utterance is divided into word groups.
- **Tonicity.** Where the most prominent pitch change or accent occurs in an utterance.
- **Tone.** What the direction of the pitch change is.

#### 2.3.1. Phrasing and tonality

An utterance can be divided into smaller units referred to as **tone units** or thought groups by means of pauses or changes in intonation. This phrasing function of intonation is often, though not always, reflected by punctuation in writing.

#### Bibliographical reference

J. C. Wells (2006). *English Intonation: An Introduction*. Cambridge: Cambridge University Press.

**Example**

The presence of pauses in the examples indicates how words are grouped together and what the intended meaning is:

- The speaker has several sisters and the relative clause defines what sister he or she is referring to: || My sister who works for the government | has not had a salary increase in several years. ||.
- The speaker has one sister and the relative clause is non-defining: || My sister, | who works for the government, | has not had a salary increase in several years. ||

Note: || means utterance boundary; | means pause.

**Example**

In this example the presence or absence of a pause before *and* determines the interpretation of the sentence:

- || She had a toast (,) with butter and cheese. ||
- || She had a toast with butter | and cheese. ||

Note: || means utterance boundary; | means pause.

**2.3.2. Focussing and tonicity**

Intonation is also used to highlight the most important information in a sentence or an utterance. When all the utterance is new information, **focus**, implemented as pitch prominence or change, falls on the last stressed word, which corresponds to the last content word. Notice that English sentences often end in a grammatical word, while in Spanish and Catalan it is more common for sentences to have a content word as the last word. Hence, Catalan/Spanish learners should avoid stressing function words even if they are in sentence final position (recall that many function words are only prominent in cases of emphasis or contrast). This is illustrated in the example, where the focus is in bold. Further, some content words are also often deaccented, such as time and place adverbs like *there*, unless they involve new information or contrast:

**Example**

I can't find my **watch**. I've spent hours **looking** for it. (not ... for it).

I've seen beautiful pictures of **Wales**. I'd love to **go** there. (not ... go **there**).

The unmarked pattern having focus on the last content word is in fact often modified for different purposes, for example to indicate what is new information, agreement or disagreement, and emphasis or contrast:

**Example**

The same sentence may show different patterns depending on what constitutes crucial information:

- Alan is moving to Seattle in **May**. (When is Alan moving to Seattle?)
- Alan is moving to **Seattle** in May. (Where is Alan moving to in May?)
- **Alan** is moving to Seattle in May. (Who is moving to Seattle in May?)

- I did. (Who completed the report?)
- I **did**. (Did you finish the report?)

Focus can also be used to show agreement or disagreement by another person in the conversation:

- The concert was very **good**.
  - It **was** good. (agreement)
  - It **wasn't** good. (disagreement)

Focus can also indicate **emphasis** or **contrast**:

- Jamie kissed Tara on the **cheek**. (not on the lips)
- Jamie kissed **Tara** on the cheek. (not Sarah)
- Jamie **kissed** Tara on the cheek. (not hit)
- **Jamie** kissed Tara on the cheek. (not Lee)

Finally, these examples illustrate cases where the last content word (the verb) does not convey essential information and focus is moved to the noun:

- The **phone** is ringing.
- The **kettle** is boiling.

One crucial difference between English and Spanish/Catalan is that English often resorts to intonation to highlight new information in the utterance, while Catalan and Spanish move the highlighted information to the end of the sentence. The greater use of intonation in the case of English is related to the fact that English has a much stricter word order than Catalan and Spanish.

#### **Example**

- These cookies are delicious. **Laura** made them.
- Aquestes galetes són boníssimes. Les ha fet la **Laura**.
- Estas galletas están buenísimas. Las ha hecho **Laura**.

### **2.3.3. Pitch movement and tone**

Tone has to do with the nature and the direction of the pitch contour. The most common types of tone are **rising** and **falling tones**, which are found in all three languages. However, the use of tones and the types of intonation melodies vary from one language to another and even from one dialect to another. For the sake of brevity we will focus on the most general tendencies. In broad terms, we can say that falling tones (F) are used when the information given is complete or conclusive, while rising tones (R) indicate the opposite, that is, inconclusive, incomplete information. Tones can also be complex (e.g., rise-fall, fall-rise), which tend to be more emotive.



Therefore, statements have falling intonation whereas questions usually have rising intonation. Wh-questions, however, tend to have a falling intonation in English, and a rising intonation is used when the speaker is asking for clarification:

Where do you come from? (F) = usual intonation

Where do you come from? (R) = where did you say you came from?

Rising and falling tones are also used in **question tags** to indicate if the speaker is simply asking for confirmation (F) or is actually expressing doubt (R):

You don't like peppers, **do you?** (F) = I am quite sure you don't like them.

You don't like peppers, **do you?** (R) = I am not sure I remember correctly.

English and Catalan/Spanish also differ in amount of pitch displacement or pitch range, which tends to be broader (more varied, less monotonous) in English than in Catalan/Spanish (Estebas, 2009). Intonation is a rather complex component of a language and what we have covered here is very limited and introductory.

### **Bibliographical references**

For more in-depth descriptions see Wells (2006) and other works in the bibliography.

### 3. Connected speech processes

Individual sounds and words are usually not uttered in isolation. Speech is a continuous flow of sounds and the pronunciation of individual segments varies depending on the environment. This is true of all languages, including English, Catalan and Spanish. The specific processes that affect sounds and words in context are referred to as **connected speech processes**. While some of these are language-specific, many are found in all three languages.

#### 3.1. Articulatory simplifications

Some processes have to do with articulatory simplifications, that is, the articulation of a given sound is modified so that it is more similar to a neighbouring sound (**assimilation**), less complex (**weakening**) or even disappear completely (**deletion**).

A sound may assimilate to a neighbouring sound in place of articulation, manner of articulation or in voicing. Thus, in colloquial or rapid speech, the alveolar *n* in *ten* is pronounced as a labial before a labial consonant (*te[m] boys*), or as a velar preceding a velar consonant (*te[ŋ] cars*). Similarly, alveolar fricatives may become palato-alveolar preceding a palatal sound (*nice shoes* [naɪʃ ju:z]). This type of assimilation is also found in Spanish (*e[m] Portugal*, *e[ŋ] Canadá*) and Catalan (*u[m] parc*, *u[ŋ] cotxe*, *do [ʃ] xais*). As we saw in the Section «Main allophonic variants», the type of regressive voicing assimilation found in Catalan and Spanish is not found in English. English has some cases of progressive voicing assimilation, such as the process behind the pronunciation of the plural, genitive or third person singular morphemes (*cat[s]*, *dog[z]*, *Jack'[s]*, *Bill'[z]*, *talk[s]*, *dig[z]*).

A specific type of assimilatory process is what is known as **coalescence**. In this case, a sequence of an alveolar stop or fricative followed by the palatal glide /j/ merge into a palatoalveolar affricate or fricative.

#### Example

/t/+j/ → [tʃ] Tuesday: [tju:zdeɪ] ~ [tʃu:zdeɪ], issue: [ɪsju:] ~ [ɪʃu:], don't you: [dəʊnt ju] ~ [dəʊntʃu]

/d/+j/ → [dʒ] schedule: [skedʒu:l] ~ [skedʒu:l], due: [dju:] ~ [dʒu:], would you: [wʊd ju] ~ [wʊdʒu]

Notice that this process accounts for the present-day pronunciation of many words that used to be pronounced as a sequence of C + /j/ (e.g., [sʃ] → [ʃ]: *tension*, *special*; [zʃ] → [ʒ]: *confusion*, *vision*; [tʃ] → [tʃ]: *culture*, *nature*; [dʃ] → [dʒ]: *soldier*).

**Weakening** involves the production of a sound with a lower degree of obstruction than usual. A well-known case of weakening common in some varieties of English, such as GA (but also in frequent words in SSBE) is **flapping**. Flapping involves the pronunciation of the stop /t/ (and possibly /d/) as a flap [ɾ] (similar to the *r* in Catalan/Spanish *pera*) in between vowels (*matter*, *city*). In contrast to Catalan and Spanish, recall that English /b d g/ are not weakened (not pronounced as fricatives or approximants) in medial position, they remain stops (*la[d]y*, *ba[b]y*, *la[g]er*). A stop may also be glottalized or replaced with a glottal stop, as in the pronunciation of *button* as [bʌʔŋ] or *what* as [wɒʔ].

A sound may also be completely deleted. As we have seen, this happens to schwa in long words (*interesting*) and to medial consonants in sequences of three or more consonants (*next door*, *wind mill*). This is known as consonant deletion and is also found in Catalan with sequences of several consonants. While there are no final C clusters in native Spanish words, weakening or deletion of single final consonants is also attested in Spanish (*Madrid* → *Madri[ð]/[θ]* or *Madrí*).

#### Note

Connected speech processes are responsible for the colloquial or informal pronunciations of sequences like *want to* and *going to* as *wanna* and *gonna* (deletion and reduction) and *got you* as *gotcha* (coalescence and reduction).

### 3.2. Linking and word contact phenomena

Precisely because speech flows continuously, word final consonants are often pronounced together with a following vowel-initial word. In fact, post-vocalic /ɹ/, which is not pronounced in non-rhotic varieties like SSBE, is pronounced when followed by a vowel. This is known as **linking r**:

Sir Elton John (*cf.* Sir Paul McCartney)

more apples (*cf.* more coffee)

By analogy, SSBE speakers often add an /ɹ/ to break a sequence of two vowels even if there is actually no /ɹ/ in the original word. This is referred to as **intrusive r**:

law [ɹ] and order

my idea [ɹ] is good

Final consonants may also be linked to a following vowel. In fact, a good strategy for Catalan/Spanish learners of English to pronounce final endings accurately is to link them with a following vowel, whenever possible. Here follow some examples. Notice that the final consonant can be resyllabified and produced together with the vowel, as indicated in the last transcription:

He stopped and looked around.

[hi 'stɒp t ənd 'lʊk t ə'raʊndl] → [hi 'stɒp t ənd 'lʊk t ə'raʊndl]

## Summary

This unit has provided a general description of the sound system of English and compared it to the sound systems of Catalan and Spanish.

First we have looked at the **segmental structure** and seen that there are some differences between the English and the Catalan/Spanish consonant inventories, particularly the **aspiration** of the stop consonants, the distribution of fricatives and affricates, and the pronunciation of the rhotics. English maintains **voicing distinctions** in final position, unlike Spanish and Catalan, and has a greater number of possible **consonant clusters**, including initial /s/+C clusters, not found in Catalan/Spanish.

English has a larger vowel system than Catalan and Spanish, involving oppositions such as the **tense-lax** distinction and low vowel contrasts that have no counterpart in Catalan/Spanish. Like Catalan, English has **vowel reduction**, but to a greater extent.

As for **suprasegmental** or prosodic structure, we have seen that while all three languages have **free stress**, English has a greater tendency for stress to fall early on in the word than Catalan/Spanish. In terms of **rhythm**, English rhythm is **stressed-timed**, while Catalan and particularly Spanish are **syllable-timed**. The nature of English rhythm has consequences for the pronunciation of unstressed syllables and function words, as we have seen with the case of the **weak forms**.

Both English and Catalan/Spanish use **intonation** to convey grammatical and pragmatic meaning, with some differences in the grammatical use of intonation. **Connected speech processes** are common in colloquial English. Some of these processes, like assimilation and deletion, are also found in Catalan and Spanish.

## Activities

1) Find minimal pairs involving the pairs of English phonemes listed below. Try to find examples involving different word positions, as is done in the example. If you need help, you can check dictionaries or available resources on the Internet.

Example: /s/ and /z/: sue – zoo, rice – rise, racing – raising, bus – buzz

- /b/ and /v/
- /s/ and /ʃ/
- /dʒ/ and /tʃ/
- /æ/ and /ʌ/
- /ɔ:/ and /ɜ:/

2) English orthography has a number of regularities but also a lot of exceptions. For example, many words contain silent letters, such as the <gh> in the word *night*. Consider the words listed below and circle the letters that are silent. If in doubt, you can check their pronunciation in a regular or a pronouncing dictionary, in print or online.

*answer, climber, debt, doubt, friend, half, hour, island, knock, listen, psychology, sign, thought, through, walk, wrong.*

3) Think of words that have the same root or origin in English and Catalan/Spanish and that are spelled with <v>. Then practice pronouncing the English words focusing on the pronunciation of the voiced labiodental /v/. A few examples are already provided below:

English	Catalan/Spanish
vowel	vocal
valley	vall/valle
divide	dividir
vocabulary	vocabulari/vocabulario

4. Practice English rhythm reading the following passage paying attention to the stressed syllables and beats ('). This passage is adapted from the website associated to Peter Ladefoged's textbook *A Course in Phonetics*. In fact, you can listen to an example of a British English speaker (P. Ladefoged himself) or an American English speaker reading this passage on the Berkeley's website:

'Stresses in 'English 'tend to re'cur at 'regular 'intervals of 'time. (') It's 'often 'perfectly 'possible to 'tap on the 'stresses in 'time with a 'metronome. (') The 'rhythm can 'even be 'said to de'terminate the 'length of the 'pause between 'phrases. (') An 'extra 'tap can be 'put in the 'silence, (') as 'shown by the 'marks wi'thin the pa'rentheses. (')

5) Look for examples of connected speech processes in the lyrics of popular songs by British or American singers. You could start with Shania Twain's famous 2002 hit «*I'm Gonna Getcha Good*». Can you detect any examples of coalescence and reduction?

## Self-evaluation

1) Explain why the sounds /s/ and /z/ are two different phonemes in English and in Catalan but they are not two separate phonemes in Spanish (they are allophones of the same phoneme).

2) Indicate at least three differences between the English and the Catalan or Spanish segmental systems.

3) Indicate whether the pronunciation of the past tense ending in the following verbs is /t/ , /d/ or /ɪd/ : *asked, attracted, changed, expected, fixed, folded, launched, lied, loved, missed, painted, stopped, studied, talked, turned, wasted.*

4) Underline the stressed syllable in the following words: *accurate, afternoon, category, catholic, chocolate, develop, elbow, international, laboratory, literature, maintain, realise, shampoo, society, vegetable, vocabulary.*

5) Consider the pronunciation of the following words and underline the vowels that are pronounced as a neutral vowel or schwa. For example: *corner, reason, ago*:

*album, allow, appear, balloon, condition, difficult, doctor, escape, favour, focus, manner, melon, memory, nation, normal, northern, parrot, precious, problem, serious, suggest, understand, wizard*

6) Underline the stressed syllables in the following words and phrases. Then match the long words on the left with the phrases on the right that have the same rhythmic pattern. For example, the word in (a) has the same rhythmic pattern as the phrase in (ii): **understanding** (secondary stress on <un>) = **Ask your father**:

a) understanding	i) Talk to me.
b) development	ii) Ask your father.
c) constitutional	iii) Forget them.
d) impression	iv) John will bring you one.
e) melody	v) Give it to me.
f) category	vi) She mentioned it.

## Answer key

### Self-evaluation

1. Both in English and in Catalan we can find minimal pairs involving /s/ and /z/, such as *race* (/s/) – *raise* (/z/) in English and *caça* (/s/) – *casa* (/z/) in Catalan. There are no minimal pairs in Spanish. In Spanish the sound [z] is only found as a variant or allophone of the phoneme /s/ preceding a voiced consonant, as in *mi[z]mo* or *de[z]de*.

2. Examples may include the following: a) /t/ and /d/ are alveolar in English and dental in Catalan/Spanish; b) English has a glottal fricative (/h/) not found in Catalan or in Standard Iberian Spanish; c) Catalan and Spanish have a palatal nasal phoneme (/ɲ/ in *any/año*) not found in English; d) English has a voiced labiodental fricative (/v/) which is not part of the phoneme inventory of most varieties of Catalan/Spanish; e) In English /ð/ is a separate phoneme, while [ð] is an allophone of /d/ in Catalan/Spanish, e.g., in intervocalic position; f) Catalan and Spanish have two rhotics, the trill /r/ and the tap /ɾ/, while in English the rhotic sound is a retroflex post-alveolar approximant /ɹ/.

3. /t/: asked, fixed, launched, missed, stopped, talked.

/d/: changed, lied, loved, studied, turned.

/ɪd/ : attracted, expected, folded, painted, wasted.

4. **accurate**, **afternoon** (and secondary stress on the first syllable), **category**, **catholic**, **chocolate**, **develop**, **elbow**, **international**, **laboratory** (SSBE) / **laboratory** (GA), **literature**, **maintain**, **realise**, **shampoo**, **society**, **vegetable**, **vocabulary**

5. **album**, **allow**, **appear**, **balloon**, **condition**, **difficult**, **doctor**, **escape**, **favour**, **focus**, **manner**, **melon**, **memory**, **nation**, **normal**, **northern**, **parrot**, **precious**, **problem**, **serious**, **suggest**, **understand**, **wizard**

6.

a) <u>u</u> nderstanding	ii) Ask your <u>f</u> ather.
b) de <u>v</u> elopment	vi) She <u>m</u> entioned it.
c) <u>c</u> onstitutional	iv) <u>j</u> ohn will <u>b</u> ring you one.
d) <u>i</u> mpression	iii) For <u>g</u> et them.
e) <u>m</u> elody	i) <u>T</u> alk to me.
f) <u>c</u> ategory	v) <u>G</u> ive it to me.

## Glossary

**affricate** Consonant articulated with complete obstruction of the air followed by a narrow opening of the oral tract.

**allophone** A possible phonetic realization or variant of a phoneme.

**approximant** Consonant articulated with a relatively open oral tract, resulting in little obstruction to the airflow.

**aspiration** Delay in the onset of vocal chord vibration (voicing) relative to the stop closure.

**assimilation** Connected speech process by which a given sound becomes more similar to a neighbouring sound.

**connected speech processes** Phonetic processes that affect individual segments and words in context.

**deletion** The loss of a segment in a word. Also referred to as elision.

**fricative** Consonant articulated with a narrow opening in the oral tract, causing the air to produce turbulence or friction.

**GA** General American English, variety of English representing standard American English.

**glottal** Articulated at the glottis, that is, the opening between the vocal chords.

**intonation** Variations in pitch, that is, the rises and falls of the pitch of the voice over time in an utterance.

**lax vowel** Vowels that are comparatively short and cannot be found in stressed open syllables.

**minimal pair** Two words that are distinguished by only one sound.

**neutral vowel** Mid central vowel that is always found in an unstressed syllable and is articulated without a specific articulatory target.  
*sin* schwa

**obstruent** Consonants that are produced with substantial obstruction to the airflow, that is, plosives, affricates and fricatives.

**phoneme** The smallest contrastive unit in the sound system of a language.

**phonetics** The study of the physical properties of speech sounds.

**phonology** The study of the function and organization of sounds in a language.

**phonotactics** The study of the possible sound sequences in a language.

**rhotic/non-rhotic variety** In rhotic varieties of English the /r/ is pronounced in all positions. In non-rhotic varieties /r/ is only pronounced if followed by a vowel.

**rhythm** Rhythm is related to the presence of beats at relatively regular intervals of time.

**SSBE** Standard Southern British English, variety of English representing standard British English.

**segmental structure** The consonant and vowel sounds or segments of a language.

**sonorant** Sounds produced without substantial obstruction to the airflow in the oral or nasal cavities, that is, approximants, nasals and vowels.

**stop** Consonant articulated with complete obstruction of the air at some point in the oral tract.  
*sin* plosive

**stress** The perceived prominence of a syllable in relation to neighbouring syllables. Syllables can be stressed or unstressed, also referred as accented or unaccented.

**suprasegmental structure** Aspects of the sound structure that span over more than one segment, such as stress, rhythm or intonation.



*sin* prosodic structure

**syllabic consonant** Consonant that can occupy the nucleus of a syllable.

**tense vowel** Vowels that are inherently long and can be found both in open and close syllables.

**voiced** Sounds produced with voicing, that is, with vibration of the vocal chords.

**voiceless** Sounds produced without voicing, that is, without vibration of the vocal chords.

**vowel reduction** The process by which vowels in unstressed syllables tend to be articulated as less peripheral, closer to the neutral vowel position.

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### Further Reading

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### Bibliographies and other online resources

**Universitat Autònoma de Barcelona** «Contrastive phonetics Spanish-English».

**Universitat Autònoma de Barcelona** «Contrastive phonetics Catalan-English».

**University of Iowa** «The sounds of American English, German and Spanish».

**Universitat de Barcelona** «Els sons del català».

