

Chapter 1. Sound System, Phonetics and Phonology

1 Introduction

A sound system is the organized set of sounds in a language and the rules for using them. It includes which sounds exist in the language, how they are produced and perceived, and how they pattern and contrast to create meaning. In linguistics, the sound system of a language is studied mainly through phonetics and phonology. Phonetics studies speech sounds as physical phenomena, independent of any specific language system, whereas phonology studies how sounds function in a particular language as part of a mental and abstract system. In other words, phonetics treats sounds as physical events, and phonology treats sounds as a cognitive system.

In second-language acquisition, learners acquire primarily the phonological system of the target language, while phonetic acquisition is often incomplete and influenced by the learner's first language. For example, a native speaker of Mandarin Chinese can easily distinguish the sound [p], a voiceless bilabial stop without aspiration, from the sound [p^h], a voiceless bilabial stop with aspiration, because these two sounds are phonologically contrastive in Mandarin. That is, they are two phonemes /p/ and /p^h/, respectively represented as *b* and *p* in Pīnyīn. In contrast, for native speakers of Spanish, Catalan, or Japanese, it is difficult to distinguish these sounds, since aspiration does not serve as a phonological contrast in their native languages. Instead, [p] and [p^h] are phonetic variants (allophones) of a single phoneme /p/. In other words, the contrast between aspirated and unaspirated stops is meaning-distinguishing in Mandarin, but not in Catalan, Spanish or Japanese.

For a similar reason, it is more difficult for native speakers of Mandarin than for native speakers of Catalan, Spanish or Japanese to distinguish between the voiced bilabial stop [b] and the voiceless bilabial stop [p], because voicing is not a phonologically contrastive feature in Mandarin, whereas it is contrastive in Catalan, Spanish, and Japanese. Put differently, the voiced-voiceless distinction does not serve to differentiate meaning in Mandarin, but it does in Catalan, Spanish, and Japanese. For further discussion of voiceless, aspirated, and voiced stops with respect to voice onset time (VOT), see https://en.wikipedia.org/wiki/Voice_onset_time.

In this chapter, we primarily introduce the phonology of vowels and consonants and their orthographic representations in Catalan, while also shedding light on the phonetic variants of each phoneme.

2 Vowels in Catalan

Catalan features seven vowels, including /a/, /ɛ/, /e/, /i/, /ɔ/, /o/, and /u/, as shown in Figure 1. See the pronunciations at https://en.wikipedia.org/wiki/IPA_vowel_chart_with_audio.

The seven vowels share five orthographies (a, e, i, o, u) that are highly connected to whether the syllables that involve them are stressed or not. For stressed syllables, *a/à*, *e/è*, *e/é*, *o/ò*, *o/ó*, *i/í* and *u/ú* are used, which respectively represent /a/, /ɛ/, /e/, /ɔ/, /o/, /i/ and /u/, see (1) for examples.

- (1) a. /a/: *sac*, *à*necs
- b. /ɛ/: *set*, *è*xit
- c. /e/: *anells*, *bé*
- d. /i/: *vi*, *així*
- e. /ɔ/: *son*, *això*

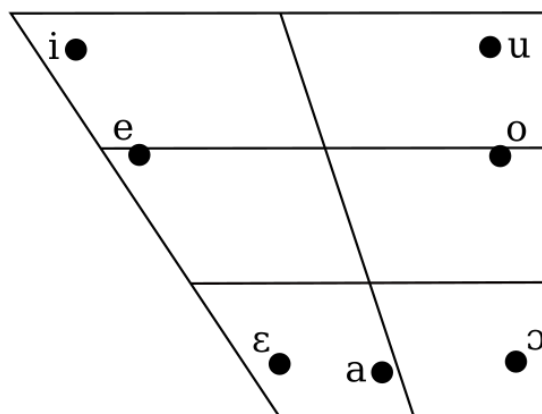


Figure 1: Vowels in Catalan

f. /o/: molt, son

g. /u/: mur, algu

For unstressed syllables, a/e, i, and o/u are used, which respectively represent /a/, /i/, and /u/, see (2) for examples.

(2) a. /a/: fadrí, entens

b. /i/: sic, ties

c. /u/: oratge, suc

In other words, there are seven vowels for stressed syllables and three vowels for unstressed ones.

3 Consonants in Catalan

There are twenty-two consonants and two semivowels in Catalan, as in Table 1. See the pronunciations at https://en.wikipedia.org/wiki/IPA_consonant_chart_with_audio.

Table 1: Consonants in Catalan

	Bilabial	Dental	Alveolar	Palatal	Velar
Nasal	m		n	ɲ	
Stop (voiceless)	p		t		k
Stop (voiced)	b		d		g
Affricate (voiceless)			ts	tʃ	
Affricate (voiced)			dz	dʒ	
Fricative (voiceless)	f		s	ʃ	
Fricative (voiced)			z	ʒ	
Approximant (central)				j	w
Approximant (lateral)			l	ʎ	
Trill			r		
Tap			ɾ		

The places of articulation, including the bilabial, dental, alveolar, palatal, and velar, can be found in Figure 2.

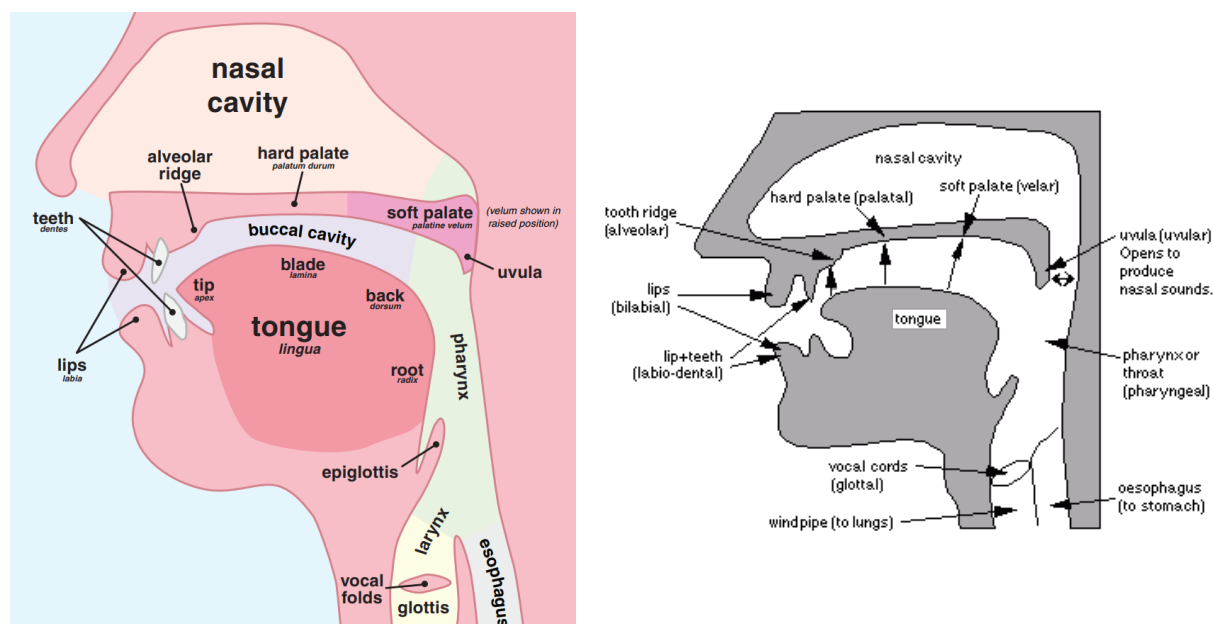


Figure 2: Places of articulation

Below we list the orthographic representations of the twenty-two consonants in Catalan, along with their phonetic variants:

- (3) /p/: p, b
 - a. [p]: por, dubte
 - b. [p^h]: sap
- (4) /b/: b, v
 - a. [b]: bell, àmbit, vell, envit
 - b. [β]: abans, avanç
- (5) /t/: t, d
 - a. [t]: terra, fred
 - b. [t^h]: set
- (6) /d/: d
 - a. [d]: drac, indret
 - b. [ð]: cada, lladre
- (7) /k/: c, q, qu, g, k, ch
 - a. [k]: cors, quan, qui, llarg, kiwi, Llach
 - b. [k^h]: suc
- (8) /g/: g, gu
 - a. [g]: guant, angle, guar
 - b. [ɣ]: aigües, agrat, lloguer

- (9) /f/: f
 a. [f]: fort, bafs
 b. [v]: hafni
- (10) /ʒ/: j
 a. [ʒ]: boja, roja, projecte
- (11) /dʒ/: j, g, tj, tg
 a. [dʒ]: joc, injecció, gespa, viatja, fetge
- (12) /s/: s, ss, ç
 a. [s]: set, està, rossa, tos, feliç
- (13) /ts/: ts
 a. [s]: lletsó, tots
- (14) /z/: z, s
 a. [z]: zel, rosa, esma
- (15) /dz/: tz, s
 a. [dz]: setze, utilitza, vens
- (16) /ʃ/: x, ix
 a. [ʃ]: xec, guix, caixa, caixmir
- (17) /tʃ/: tx, ig, g
 a. [tʃ]: txec, veig, mig
- (18) /l/: l, ll
 a. [l]: laca, val, cella
- (19) /ʎ/: ll
 a. [ʎ]: llac, cella
- (20) /m/: m
 a. [m]: meu, comte
 b. [ɱ]: limfa
- (21) /n/: n
 a. [n]: neu, dansa
 b. [ɲ]: sang, cigne
- (22) /ɲ/: ny
 a. [ɲ]: nyeu, Espanya
- (23) /r/: r, rr
 a. [r]: ruc, mirra, horra
- (24) /ɾ/: r
 a. [ɾ]: mira, truc, per

Below we list the orthographic representations of the two semivowels in Catalan:

- (25) /j/: i, y
 a. [j]: iode, posa-hi, York

(26) /w/: u, o, w

- a. [w]: quart, Güell, posa-ho, web

4 Pattern of stress

Firstly, Catalan words are normally stressed on one of the last three syllables, where paroxytone stress is the most common, as shown in (27).

- (27) a. Oxytone (last syllable stressed): cantó
 b. Paroxytone (second-to-last syllable stressed): taula
 c. Proparoxytone (third-to-last syllable stressed): màquina

Secondly, Catalan uses accents (´, called *accent agut*, and ` , called *accent greu*) to mark stress when it deviates from what is expected based on the word ending. The expected and default stress pattern is:

(28) Penultimate syllable:

- a. Words ending with vowels: rosa, setze
 b. Words ending with diphthongs or semivowels: dormiu, homeu
 c. Words ending with /s/, /n/, /l/: parles, examen, nassal

(29) Final syllable:

- a. Words ending with consonants except /s/, /n/, /l/: arreb, ordenador

(30) Special cases:

- a. Final syllable for words ending with /ç/: feliç
 b. Final syllable for words ending with /l/: animal