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20 French*

Abstract: The phonology of French has a long descriptive and theoretical tradition, which however has been partly built on an idealized standard variety of the language, overlooking its wide array of dialectal variation. Recent corpus-based work has brought about significant advances in the description and understanding of the sound system of French, as it is spoken around the world. Benefiting in particular from the research program "Phonologie du français contemporain" (Durand/Laks/Lyche 2002), this chapter presents the main segmental, suprasegmental, and morphophonological features of French, including schwa and liaison. It focuses on a standard variety, globally defined as spoken in the northern half of France without a perceptible dialectal or sociolectal accent, and on the main dialectal features, found more specifically in three geographical areas: Canada, southern France, and Switzerland.

Keywords: French, schwa, liaison, gliding, cluster reduction.

1   Introduction

The phonology of French has a long descriptive and theoretical tradition. Several phenomena specific to French, notably schwa and liaison, have challenged learners of French as well as phonological theory for decades. But this tradition has been built has relied largely on a language variety that can be characterized as an idealized standard, without adequate consideration of the rich dialectal variation that exists in French.

We present here the main segmental, suprasegmental, and morphophonological features of the language. Priority is given to empirical generalizations rather than theoretical accounts: analytical issues are mentioned, but not necessarily resolved. This chapter has benefited from recent advances in the description and understanding of the sound system of French brought about by the research program "Phonologie du français contemporain" (PFC; Durand/Laks/Lyche 2002). The limited survey presented here obviously does not exhaust the range of phenomena or variation that can be observed across the French-speaking world, but Durand/Laks/Lyche (2009), Gess/Lyche/Meisenburg (2012), and Detey et al. (2010; 2016) offer more detailed descriptions.

We focus on a standard variety and address dialectal variation mainly, but not exclusively, through three geographical areas: Canada, southern France, and Switzerland. With respect to pronunciation, the concept of "standard variety" may itself refer to two distinct notions: (1) the pronunciation of speakers perceived as "standard" and characterized by their geographical origin (Paris or more generally urban northern France), their socioeconomic profile (educated, elite), and/or their status as professional speakers (e.g. newscasters); (2) the pronunciation described in reference books (grammars, dictionaries, textbooks) and whose origin is not clearly established (cf. Lyche 2010). While French phonology has traditionally largely relied on the second view (often not explicitly; cf. Morin 1987), recent corpus-based work has prompted a shift toward the first view, even though the definition of the targeted speakers tends to remain quite general (speakers from the northern half of France without a perceptible regional or sociolectal accent). This is the (admittedly unsatisfactory) notion of standard adopted here. In some cases, notably in the discussion of phoneme inventories, corpus-based descriptions differ from those found in reference books, more appropriately identified as "conventional".

The chapter is divided into eight parts, moving from segments to higher prosodic units. Sections 2 and 3 are devoted to vowels and consonants: the respective inventories and a selection of processes that affect them. Latent segments, schwa and liaison consonants, are discussed in Section 4. The last sections focus on suprasegmental phonology: the syllable (Section 5), the word (Section 6), and prosody, especially stress and intonation (Section 7). Section 8 offers a brief conclusion.

2 Vowels

The vowel system varies considerably across varieties of French. The vowel inventory is first established on the basis of final syllables, which present the largest number of contrasts; the standard variety (2.1) serves as a reference point for the discussion of dialectal variation (2.2). The distribution of vowels in non-final syllables is addressed in 2.3 and processes involving close vowels are discussed in 2.4.

2.1 The standard vowel inventory

Defining a standard vowel inventory for French is a delicate task considering the varied interpretations of "standard". Reference books such as dictionaries, grammars, and textbooks provide almost invariably the 16-vowel inventory shown in

Table 1. It includes twelve oral and four nasal vowels, distinguishing three points of articulation – front unrounded, front rounded, and back – and four degrees of aperture. The vowel /ə/ is variably classified as central, according to its IPA value, or front rounded, corresponding to its normal realization, close to [œ] or [ø]. Its phonemic status being highly contentious, schwa is addressed separately in 4.1 and ignored in the remaining discussion of the vowel inventory.

	Front unrounded	Front rounded		Back
Close	i	y		u
Close-mid	e	ø	ə	o
Open-mid	ɛ ɛ̃	œ œ̃		ɔ ɔ̃
Open	a			ɑ ɑ̃

Table 1: The conventional vowel inventory.

This conventional inventory, however, no longer clearly corresponds to that of a well-defined community, nor to an explicit model which native speakers aim at. Its value now essentially lies in its providing a stable point of comparison between varieties. If "standard" refers to a specific variety, perceived as neutral or unaccented and characteristic of the northern half of France, the inventory would be smaller and less stable than the one shown in Table 1. In actual usage, five vocalic contrasts among those in Table 1 are in a more or less advanced state of weakening (Lyche 2010; Hansen/Juillard 2011; Østby 2016 and references therein). They are listed in (1) with representative minimal pairs.

(1) a. /ɛ̃/-/œ̃/   *brin* /bʁɛ̃/ 'strand'   *brun* /bʁœ̃/ 'brown$_M$'
     b. /a/-/ɑ/   *patte* /pat/ 'leg, paw'   *pâte* /pɑt/ 'paste'
     c. /e/-/ɛ/   *pré* /pʁe/ 'meadow'   *près* /pʁɛ/ 'close'
     d. /ø/-/œ/   *jeûne* /ʒøn/ 'fast$_{NOUN}$'   *jeune* /ʒœn/ 'young'
     e. /o/-/ɔ/   *saute* /sot/ 'jump$_{IMP}$'   *sotte* /sɔt/ 'silly$_F$'

The first two pairs have now been essentially neutralized and the consensus is that the standard inventory no longer includes /œ̃/ and /ɑ/ (the remaining open vowel /a/ taking on a more central quality). The pairs in (1c–e) concern the opposition between oral close-mid and open-mid vowels. This contrast is mainly active in one context: in final open syllables for /e/-/ɛ/, in final closed syllables for the rounded pairs /o/-/ɔ/ and /ø/-/œ/. And even in these contexts we observe ongoing weakening, especially for /ø/-/œ/. The point of exclusion has not been reached, however, and the standard vowel inventory in Table 2 can safely be established.

	Front unrounded	Front rounded	Back
Close	i	y	u
Close-mid	e	ø	o
Open-mid	ɛ ɛ̃	œ	ɔ ɔ̃
Open	a		ɑ̃

Table 2: The revised standard vowel inventory.

This inventory is never fully realized since the two series of mid vowels are always at least partly neutralized in any given context. Table 3 summarizes the distribution of mid vowels in final syllables, distinguishing the unrounded pair /e/-/ɛ/ and the two rounded pairs (cf. 2.3 for non-final syllables).

	/e/-/ɛ/	/ø/-/œ/ and /o/-/ɔ/
Final open syllables	Contrast (cf. 1c) *pré* /pʁe/ *près* /pʁɛ/	Only /ø/, /o/ e.g. *sot* /so/ 'silly_M'
Final syllables closed by /z/	Only /ɛ/ e.g. *chaise* /ʃɛz/ 'chair'	Only /ø/, /o/ e.g. *chose* /ʃoz/ 'thing'
Final syllables closed by /ʁ/	Only /ɛ/, /œ/, /ɔ/ e.g. *guerre* /gɛʁ/ 'war', *peur* /pœʁ/ 'fear', *cor* /kɔʁ/ 'horn'	
Other final closed syllables	Only /ɛ/ e.g. *sept* /sɛt/ 'seven'	Contrast (cf. 1d–e) *jeûne* /ʒøn/ *jeune* /ʒœn/ *saute* /sot/ *sotte* /sɔt/

Table 3: The distribution of mid vowels across contexts in final syllables.

In final open syllables, only the unrounded pair contrasts, while the rounded ones are neutralized toward /ø/, /o/. In final closed syllables, /e/ is banned in favor of /ɛ/, but the rounded pairs have a more complex distribution: only /ø/, /o/ before /z/, only /œ/, /ɔ/ before /ʁ/, and contrast before other consonants (with localized cases of neutralization, for instance only /ɔ/ before /g/, /ɲ/, as in *vogue* /vɔg/ 'fashion' and *cigogne* /sigɔɲ/ 'stork').

2.2 Dialectal variation in vowel inventories

Vowel inventories vary both in the number and quality of contrastive vowels. Varieties of French spoken as a first language may be grossly divided into two categories: (i) northern varieties are spoken in Europe in areas historically associated with *langue d'oïl* and *francoprovençal* (###22 Francoprovençal) (northern half of France, Belgium, Switzerland) and, outside Europe, in former colonies peopled by speakers of northern varieties in the 17th and 18th centuries; (ii) southern varieties are spoken in the *langue d'oc* area in the southern half of France. Three regional varieties are briefly described: Southern French, Swiss French,

and Laurentian French (Canada). These varieties have undergone distinct historical developments and illustrate different tendencies away from the (northern) standard system presented in 2.1.

Southern French (Durand 2009; Courdès-Murphy 2018) has the simplest inventory, with seven vowels: /i y u E Œ O a/. /E Œ O/ represent mid vowels underspecified for aperture, the distinction between close-mid and open-mid vowels being completely neutralized in most southern varieties. The quality of mid vowels is determined by syllable structure: open-mid in closed syllables, close-mid in open syllables.[1] For example, *pré* 'meadow' and *près* 'close' are both realized [pχe]. Regarding nasal vowels, Southern French avoids the /ɛ̃/-/œ̃/ neutralization, but the phonemic status of nasal vowels is questionable, as several arguments suggest they be analyzed as underlying sequences of an oral vowel and a nasal consonant (Durand 2009; Courdès-Murphy 2018).

Swiss and Laurentian French, both northern varieties, stand at the opposite end of the spectrum in terms of the number of contrasting vowels. They have in common the conservative use of vowel length as a distinctive feature, which has been lost in the standard variety. But they differ in the relationship between length and quality and the contexts where length contrasts are realized.

Swiss varieties (Métral 1977; Racine/Andreassen 2012) mostly maintain the conventional contrasts in Table 1 (disregarding schwa), with the /a/-/ɑ/ contrast (1b) reinterpreted in some regions as one of length /a/-/aː/. In addition, the historical /ɛ/-/ɛː/ contrast remains productive, as in *faites* /fɛt/ 'do_IMP.PL' vs. *fête* /fɛːt/ 'party'. But the most salient feature of the Swiss French system is the maintenance of length distinctions in final open syllables for the vowels /i y u e ø ɛ a/, as illustrated in (2).

(2) a. *vit* /vi/ 'live_3SG' vs. *vie* /viː/ 'life'
     b. *bleu* /blø/ 'blue_M' vs. *bleue* /bløː/ 'blue_F'
     c. *voix* /vwa/ 'voice' vs. *voie* /vwaː/ 'track'

Many Swiss varieties also differ from the standard system in avoiding the neutralization between /o/ and /ɔ/ in final open syllable (cf. Table 3, first line), as in *saut* /so/ 'jump' vs. *sot* /sɔ/ 'silly_M'. The system just sketched and summarized in Table 4 can be considered maximal, as certain contrasts may be absent in some regions or weakening among younger speakers.

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[1] This is the so-called *loi de position*, which applies with regularity in Southern French, but only in limited contexts in northern varieties. As a principled exception to this *loi* in southern varieties, open-mid vowels surface in open syllables when the following vowel is a schwa (cf. 4.1), as in *nette* [nɛ.tə] 'clean_F' and *netteté* [nɛ.tə.te] 'cleanliness' (cf. Eychenne 2014).

	Front unrounded	Front rounded	Back
Close	i iː	y yː	u uː
Close-mid	e eː	ø øː	o
Open-mid	ɛ ɛː ɛ̃	œ œ̃	ɔ ɔ̃
Open	a aː		(ɑ) ɑ̃

Table 4: The Swiss French vowel inventory, adapted from Racine/Andreassen (2012).

Laurentian French (Côté 2012) is also characterized by a strong distinction between short and long vowels, but one that is associated with concomitant differences in quality. All the contrasts in the conventional system in Table 1 are maintained without any sign of weakening. The distinction between close-mid and open-mid vowels is enhanced by length, as well as that between the two open vowels; the back open vowel (and its nasal counterpart) are also rounded. The historical /ɛ/-/ɛː/ opposition still attested in Swiss French is also robust in Laurentian French, but the long vowel has taken a distinct quality, transcribed /ɜː/ (Côté/Lancien 2019). The nasal vowels are long and different in quality: the standard /ɛ̃/ tends toward /ẽː/ and /ɔ̃/ has a fronted variant [ã̃ː]. More distinctively, a series of near-close vowels, originally allophonic, has developed in opposition to a close one, as in *bise* /biːz/ 'kiss' vs. *Biz* /bɪz/ (proper name). This results in a symmetrical contrast between two degrees of height (or a tense-lax distinction) in both close and mid vowels. The complete system appears in Table 5.

	Front unrounded	Front rounded	Back
Close	iː	yː	uː
Near-close	ɪ	ʏ	ʊ
Close-mid	eː ẽː	øː	oː
Open-mid	ɛ ɜː	œ œ̃ː	ɔ ɔ̃ː
Open	a		ɒː ɒ̃ː

Table 5: The Laurentian French vowel inventory, adapted from Côté (2012).

This rich oral inventory includes eight vowel pairs distinguished by both length and quality (/ɛ/ is involved in two pairs): /iː ɪ/, /yː ʏ/, /uː ʊ/, /eː ɛ/, /ɜː ɛ/, /øː œ/, /oː ɔ/, and /ɒː a/. It is fully realized in final closed syllables; in addition to the *bise-Biz* contrast above for close vowels, examples include *pâte* /pɒːt/ vs. *patte* /pat/ 'leg, paw' for open vowels (compare with 1b) and *prête* /pʁɛt/ 'ready_F' vs. *prête* /pʁɜːt/ 'lend_IMP' vs. *break* /bʁeːk/ 'break' for front unrounded mid vowels (/eː/ being found essentially in integrated loanwords). All vowel pairs are neutralized in two contexts, where length is no longer distinctive: before final /ʁ/ and in final open syllables. Neutralization, however, mixes length and quality and operates in two opposite directions: before /ʁ/, vowels are long but more open [ɪː ʏː ʊː ɜː œː ɔː ɒː] (e.g. *pire* [pɪːʁ] 'worse', *peur* [pœːʁ] 'fear'), word-finally they are short but

more close [i y u e ɛ ø o ɒ] (e.g. *pis* [pi] 'so', *peu* [pø] 'little').[2] The only complication concerns the trio of front unrounded mid vowels /eː ɛː ɛː/: /e/ and /ɛ/ still contrast word-finally (as in 1c), but only /ɜː/ surfaces before /ʁ/ (e.g. *père* /pɜːʁ/ 'father').

In both Laurentian and Swiss varieties, vowel length is enhanced by diphthongization. In Switzerland, diphthongization targets word-final vowels, especially /eː/ realized as [eɪ], e.g. *journée* /ʒuʁneː/ [ʒuʁneɪ] 'day'. In Laurentian French, it applies most notably in final closed syllables. Diphthongs are closing and maintain the rounding, nasalization, and point of articulation of the underlying vowel. But they vary in the initial and final degrees of aperture: the initial degree is at least as open as the underlying vowel, the final degree at least as close. Representative examples are given in (3).

(3) a. *père* 'father' /pɜːʁ/ [paɜʁ]~[paeʁ]~[paiʁ]~[pɜeʁ]~[pɜiʁ]
     b. *paume* 'palm' /poːm/ [pɔom]~[pɔum]~[poum]
     c. *pente* 'slope' /põːt/ [põɔ̃t]~[põõt]~[põũt]

2.3   Vowels in non-final syllables

Vowel contrasts in non-final syllables are weaker than in final syllables. The opposition between close-mid and open-mid vowels in particular is largely obliterated (in varieties that maintain it in final syllables). The realization of mid vowels in non-final syllables is thus highly variable and conditioned by several factors, including:

-   syllable structure: close-mid vowels are favored in open syllables and open-mid ones in closed syllables;

-   analogy: forms derived by suffixation tend to retain the root vowel appearing in final syllables in the unsuffixed form;

-   harmony: harmony favors vowels whose aperture is close to that of the vowel in final syllables: close-mid vowels before close(-mid) ones, open-mid vowels before open(-mid) ones (cf. Nguyen/Fagyal 2008);

-   segmental constraints: open-mid vowels are favored in syllables closed by /ʁ/ and close-mid vowels before /z/, as in final syllables (Table 3);

-   general preferences for specific vowels: Tranel (1987), for instance, considers /e/, /œ/, /ɔ/ as the default vowels in non-final syllables, Hansen/Juillard

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[2] In both contexts, the default open vowel is back; /a/ remains contrastive, but very marginally.

(2011) document a general closing tendency in Paris, and certain Swiss varieties show a strong preference for open-mid vowels;

- spelling: certain spellings tend to be associated with specific vowels, for instance <é> with /e/, <è>, <ê> with /ɛ/, <au> with /o/, <o> with /ɔ/.

These factors act and interact in different ways in varieties of French. They often make contradictory predictions, whose resolution depends on the relative weight of each factor. For instance, the word *aigri* 'embitter~PST.PTCP~' may be pronounced [ɛgʁi] or [egʁi]. The [ɛ] variant is favored by analogy with the base form *aigre* [ɛgʁ] 'bitter' and an association between <ai> and [ɛ]; the [e] variant is selected by syllable structure ([e.gʁi]) and vowel harmony.

Parisian and Southern French favor [egʁi]: Southern French has generalized the role of syllable structure; Parisian French offers a more complex picture, including a growing tendency toward close-mid vowels. In contrast, Laurentian and certain Swiss varieties opt for [ɛ], albeit for different reasons. The latter generally favor [ɛ] in non-final syllables, including in underived forms like *béton* [bɛtɔ̃] 'concrete'. In Laurentian French, analogy is the dominating factor, hence *aigri* [ɛgʁi]; cf. also *fêter* [fɜːte] 'celebrate~INF~' by analogy with *fête* [fɜːt][3] 'party'. In underived forms, vocalic contrasts are maintained more robustly than in other varieties, as in *maudite* /moːdɪt/ 'damned~F~' vs. *modique* /mɔdɪk/ 'modest' and *raison* /ʁɜːzɔ̃/ 'reason' vs. *raisin* /ʁɛzɛ̃/ 'grape'.

2.4 Close vowels

Close vowels undergo specific changes. They are subject to different processes – devoicing, laxing, syncope – in two opposite contexts: utterance-final and phrase-medial (2.4.1). They also alternate with glides in prevocalic position (2.4.2). These processes apply in different modalities across varieties.

2.4.1 Devoicing, laxing, syncope

Devoicing in European varieties applies in two different contexts. The better known one is exemplified by words like *oui* [wi̥ç] 'yes' and *merci* [mɛχsi̥ç] 'thanks': the final [i] is devoiced, but also followed by a fricative-like noise (Smith 2003; Candea 2012; Dalola 2014; 2015 and references therein; ###11 Sociophonetics). This type of devoicing preferentially targets close vowels, in particular [i]; it mostly applies in utterance-final or pre-pausal position, hence its interpretation as a marker of finality.

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[3] Typically realized with one of the diphthongized variants of [ɜː]; cf. (3a) above.

Devoicing also applies phrase-medially, in a prosodic position that is opposite to the utterance-final one above (Torreira/Ernestus 2010). It targets close vowels in the context of voiceless consonants, such as the [i] of *ticket* [ti̥kɛ] 'ticket' and the [y] of *supporter* [sy̥pɔχtɛʁ] 'sports fan'. Over a third of phrase-medial close vowels preceded by a voiceless consonant are completely devoiced. Phrase-medial devoicing is a manifestation of vowel reduction in unstressed position; unlike its final counterpart, it does not appear to play any discursive role.

Dialectal variation in vowel devoicing remains to be investigated. But one variety that has been studied with respect to the realization of close vowels is Laurentian French (cf. Côté 2012 and references therein). Final devoicing is not observed, but word-medial close vowels reduce in various ways. Devoicing and syncope are very productive, as in *université* [yn(i)vɛχs(i̥)te] 'university'. Close vowels in non-final syllables are also variably laxed, as a result of two processes: harmony with a near-close/lax vowel in final syllables (e.g. *poutine* [pʊtɪn] 'poutine') and closed-syllable laxing, which applies depending on the nature of the coda consonant (e.g. *Linda* [lɪn.dɒ] (proper name)).

2.4.2 Gliding

Close vowels are variably realized as glides when followed by another vowel. This is illustrated in (4, 5) morpheme-internally and in derived contexts, where a close vowel at the end of a verbal root alternates with the corresponding glide before a vowel-initial suffix.

(4) a. /i/ *miette* [mi.ɛt]~[mjɛt] 'crumb'
     b. /y/ *muette* [my.ɛt]~[mɥɛt] 'dumb_F'
     c. /u/ *mouette* [mu.ɛt]~[mwɛt] 'seagull'

(5) a. /i/ *scie* [si] 'saw_IMP' *scier* [si.e]~[sje] 'saw_INF'
     b. /y/ *sue* [sy] 'sweat_IMP' *suer* [sy.e]~[sɥe] 'sweat_INF'
     c. /u/ *joue* [ʒu] 'play_IMP' *jouer* [ʒu.e]~[ʒwe] 'play_INF'

After obstruent+liquid (OL) clusters, gliding is blocked (6, 7), except morpheme-internally with the sequences [wa], [wɛ̃], [ɥi] (8). This is accounted for by a constraint against OLG (obstruent+liquid+glide) complex onsets. The special status of [wa], [wɛ̃], [ɥi] follows from their interpretation as diphthongs, syllabified in the nucleus, rather than as consonant+vowel sequences. When the close vowel is followed by a morpheme boundary, as in (6), the diphthongal analysis is excluded, giving rise to the contrast *troua* (6c) vs. *trois* (8a).

(6) No gliding in derived contexts after OL clusters:
     a. /i/ *crier* [kχi.e] *[kχje] 'shout_INF'

b. /y/ *influer* [ɛ̃fly.e] *[ɛ̃flɥe] 'affect_INF'
c. /u/ *troua* [tχu.a] *[tχwa] 'hole_3SG.PRET'

(7) No gliding morpheme-internally after OL clusters with sequences other than [wa], [wɛ̃], [ɥi]:
a. /i/ *trio* [tχi.o] *[tχjo] 'trio'
b. /y/ *gluant* [gly.ɑ̃] *[glɥɑ̃] 'sticky'
c. /u/ *brouette* [bʁu.ɛt] *[bʁwɛt] 'wheelbarrow'

(8) Gliding morpheme-internally after OL clusters with [wa], [wɛ̃], [ɥi]:
a. /wa/ *trois* [tχwa] 'three'
b. /wɛ̃/ *groin* [gʁwɛ̃] 'snout'
c. /ɥi/ *truite* [tχɥit] 'trout'

In actual usage, the patterns in (6–8) are quite regular, although Southern French has been reported to allow gliding morpheme-internally with sequences other than [wa], [wɛ̃], [ɥi] (Durand/Lyche 1999). But gliding, or syneresis, is highly variable across contexts and varieties in the general case (4, 5). In the standard variety, it is presented as systematic, but more detailed descriptions show that this is not quite so; other varieties (Southern, Laurentian, Swiss) display a stronger preference for dieresis (Klein 1991; Kelly 2015; Côté 2018). Gliding is conditioned by several factors, including:

- the morphological context: syneresis is more frequent morpheme-internally (4) than in derived contexts (5);

- the identity of the vowel: syneresis follows the hierarchy /i/>/u/>/y/;

- the number of syllables: syneresis is favored in longer words;

- the nature of the preceding consonant: syneresis appears to be favored after voiceless consonants, although this effect remains to be more systematically investigated.

3   Consonants

The standard inventory and some points of variation are discussed in 3.1, a selection of consonantal processes subject to dialectal variation is presented in 3.2.

3.1 Inventory

The standard inventory is given in Table 6. It includes five modes of articulation (plosives, fricatives, nasals, liquids, glides). Plosives and nasals distinguish between labial, coronal, and dorsal consonants, while fricatives have two pairs of coronal segments. All obstruents display a voicing contrast. Liquids include a lateral approximant /l/ and a rhotic /ʁ/, whose mode of articulation varies between a fricative, a trill, and an approximant. Three glides /j/, /ɥ/, /w/ complete the inventory.

	Labial		Coronal		Dorsal		
	Bilabial	Labiodental	Alveolar	Postalveolar	Palatal	Velar	Uvular
Plosive	p b		t d		k ɡ		
Fricative		f v	s z	ʃ ʒ			
Nasal	m		n		(ɲ)	(ŋ)	
Liquid			l				ʁ
Approximant					j ɥ	w	

Table 6: The standard consonant inventory.

The main issue in this inventory concerns the dorsal nasals. On the one hand, the status of /ŋ/ is debated. The velar nasal is taken to have been borrowed with English words ending in *-ing* (e.g. *shopping* /ʃɔpiŋ/, *building* /bildiŋ/; ###15 Loanword phonology in Romance) and it contrasts with /ɲ/, found in the native lexicon (e.g. *digne* /diɲ/ 'worthy'). Sampson (1992), however, argues that the variability and distribution of [ŋ] do not justify granting it a phonemic status. On the other hand, the status of /ɲ/ itself is questionable, as it has merged with /nj/: *agneau* [anjo] 'lamb', *panier* [panje] 'basket' (cf. also Durand/Lyche 2019).

Dialectal variation with respect to the consonantal inventory is relatively limited. The rhotic is the most variable segment, in mode and point of articulation as well as voicing (cf. 3.2). Concerning point of articulation, some varieties have an apical [r], either as a conservative feature or as a contact phenomenon. In Europe, [r] can be found in rural areas among the oldest generation of speakers. In Canada, apical variants used to be dominant, but they have been giving way to dorsal ones since the 1950s. In Africa, the apical rhotic is frequent in contact with local languages that have a similar sound. With respect to glides, some varieties, notably in Belgium, have neutralized the /ɥ/-/w/ contrast in favor of /w/ (e.g. *juin* 'June' and *joint* 'join3SG' both pronounced [ʒwɛ̃]) (Hambye/Simon 2012, 135).[4]

Additional consonantal phonemes that can be found in regional varieties are of two sorts: the maintenance of historical features or contact phenomena. The

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[4] This does not prevent [ɥ] from surfacing as an allophone of /y/, as in *muette* [myɛt]~[mɥɛt] 'dumbF'.

first case is illustrated by the preservation of the lateral /ʎ/ and the fricative /h/ by older speakers in the French Basque Country, as in *étriller* [etʁiʎe] 'currycomb_INF' ([etʁije] in the standard variety) and *hasard* [hazaʁ] 'chance' (Durand 2009). The conservative use of /h/ is observed in many varieties, especially outside France, but this sound may also be acquired as a result of contact. For example, Swiss varieties have integrated a number of consonants through Germanisms, including /h/, a dorsal fricative /χ/ (distinct from the French rhotic), and affricates /t͡ʃ d͡ʒ t͡s d͡z k͡χ/ (Racine/Andreassen 2012).

3.2   Processes

This section briefly describes some consonantal processes that display dialectal variation: obstruent voicing, variants of /ʁ/, plosive affrication, and the variable realization of word-final consonants.

The voicing contrast within obstruents may be neutralized as a result of assimilation or phrase-finally. First, we observe two variable patterns of voicing assimilation. On the one hand, assimilation normally applies regressively within obstruent clusters (9a) (Hallé/Adda-Decker 2011), but assimilation may be progressive if the obstruents are adjacent as a result of schwa omission morpheme-internally (cf. 4.1.1) (9b). On the other hand, obstruents variably voice before a sonorant. When the sequence is not word-initial (9c), voicing is variable but not restricted to a particular area. Word-initially (9d), voicing does not generally apply, except in southern varieties (Durand 2009).

Second, voiced obstruents are variably devoiced word or phrase-finally (9e). While devoicing is occasionally observed across all varieties as a strict phonetic effect, it applies most characteristically in certain varieties, and as such serves as a dialectal marker. The areas concerned include southern France (Durand 2009) and both sides of the Belgian-French border, subject to adstratic (Flemish) and substratic (Walloon, Picard) influence (Hambye/Simon 2012; Pooley 1994).

The (de)voicing of obstruents brings us to that of /ʁ/: /ʁ/ devoices both after (9f) and before (9g) voiceless segments, as well as, variably, in initial (9h) and final (9i) position. The voicelessness of the rhotic is generalized toward [χ] in some varieties (e.g. in areas of Switzerland, Racine/Andreassen 2012). Beyond voicing, the rhotic may also weaken, vocalize, or delete in coda or word-final position (9i). Vocalization is pervasive in Laurentian French, deletion more characteristic of many varieties in Africa, the Indian Ocean, and the West Indies (Detey et al. 2010; Lyche/Meisenburg/Gess 2012).

(9)   a.   *disgrâce*   [dizgʁas]   'disgrace'
            discrédit   [diskχedi]   'discredit'
      b.   *cheveu*   [ʃəvø] ~[ʃfø]   'hair'

c.	*islamique*	[islamik]~[izlamik]	'Islamic'
	socialisme	[sɔsjalism]~[sɔsjalizm]	'socialism'
d.	*slip*	[slip] (general), [zlip] (Southern Fr.)	'underwear'
e.	*malade*	[malad]~[malat]	'sick'
f.	*patrie*	[patχi]	'homeland'
g.	*parti*	[paχti]	'gone'
h.	*riz*	[ʁi]~[χi]	'rice'
i.	*port*	[pɔʁ]~[pɔχ]~[pɔɐ̯]~[pɔˤ]~[pɔː]	'port'

Two major types of plosive affrication are observed in different varieties. In France, we see a frequent, and possibly growing, tendency to affricate coronal, and to a lesser extent velar, plosives followed by close anterior vowels. *Tu* 'you' may thus be pronounced [tʲy] or, as a more salient variant, [tʃy] (Devilla/Trimaille 2010). This feature is observed across the country and appears to be rather associated with young speakers with an immigrant background, but the social meaning of this variable remains to be clarified (###11 Sociophonetics).

Laurentian French is well-known for another type of affrication, whereby /t d/ are realized [tˢ dᶻ] before close front vowels and glides, as in *tu* [tˢy] 'youSG' and *dieu* [dᶻjø] 'god'. Affrication has been completely phonologized; it is systematic within words and variable across words, as in *sept idées* [sɛt(ˢ)ide] 'seven ideas' (Côté 2012).

Finally, a number of lexical items end in single consonants whose realization varies across geographical areas (rather than linguistic contexts). As shown by the words in (10) (Avanzi 2016; 2017 for 10a–c), the dialectal distribution of these variable consonants defies generalizations.

(10)	a.	*vingt*	'twenty'	[vɛ̃]	France (except East), Canada
				[vɛ̃t]	Belgium, Switzerland, East of France
	b.	*moins*	'less'	[mwɛ̃]	Everywhere
				[mwɛ̃s]	Southern France
	c.	*persil*	'parsley'	[pɛχsi]	Large area around Paris, Canada
				[pɛχsil]	Dominant form in France
	d.	*but*	'goal'	[by]	Canada, minority form in Europe
				[byt]	Majority form in Europe
	e.	*bout*	'end'	[bu]	Everywhere
				[but]	Canada

4   Latency phenomena

French is famous for its segmental latency phenomena, whereby a consonant (liaison) or a vowel (schwa) is realized or omitted, depending on a variety of lin-

guistic and extralinguistic factors. These two cornerstones of the pronunciation of French are discussed here in more detail.

4.1 Schwa

The French schwa is as frequent in the language as it is complex, in addition to serving as a salient dialectal marker (####4 From vowel weakening in Romance to French schwa). Its definition and the basic elements of its behavior are addressed in 4.1.1, contrasting northern and southern varieties; its distribution and the relevant conditioning factors are reviewed in 4.1.2.

4.1.1 Definition

The French schwa has been defined in the literature by the following elements.[5]

(11) a.   Its phonetic quality, usually taken to be close, but not necessarily identical, to [œ], [ø], or, in some contexts, [ə]; the traditional symbol [ə] is maintained here, without indicating a specific vowel quality;
      b.   its alternation with Ø;
      c.   its orthographic correspondence with <e>.

The proper interpretation of these elements, however, requires that we consider separately the two contexts where schwa appears – morpheme-finally and morpheme-internally – and two broad categories of varieties – northern and southern – which display contrastive patterns.

Morpheme-finally in northern varieties, any morpheme ending in a consonant may be followed by a vowel alternating with Ø; the context then determines how likely the vowel is to be realized (cf. 4.1.2). This is illustrated in (12) for *juste* 'just' and *aime* 'like$_{1/3SG}$' in a standard variety, as they are realized without a final schwa (12a), with a variable schwa (12b), or with a categorical schwa (12c), depending on the environment.

(12) a.   *juste ici*   [ʒystisi]   'just here'
              j'aime tout   [ʒɛmtu]   'I like$_{1SG}$ everything'
       b.   *juste là*   [ʒyst(ə)la]   'just there'
              j'aime rien   [ʒɛm(ə)ʁjɛ̃]   'I like$_{1SG}$ nothing'
       c.   *justement*   [ʒystəmɑ̃]   'just$_{ADV}$'
              aimeriez   [ɛməʁje]   'like$_{2PL.COND}$'

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[5] Another element is its unstressed prosodic status, with the possible exception of the postverbal clitic *le*, whose vowel is stable and stressed, e.g. *dis-le* [dilø]~[dilœ] 'say$_{IMP}$ it'.

Importantly, this alternation applies to morphemes with and without an ortho-graphic <e>, so *golfe* and *golf* are both realized [gɔlf(ə)] (13a), *cette* and *sept* [sɛt(ə)] (13b; cf. 6.3 and Tranel (1981) regarding schwa before *h aspiré*). (11c) is therefore not a definitional element of schwa morpheme-finally. When realized, schwa corresponds to a front rounded vowel, although the quality of boundary schwa in northern varieties has not been systematically investigated.[6]

(13) a. *golf/golfe russe*   [gɔlf(ə)ʁys]   'Russian golf/gulf'
      b. *cette/sept housse(s)* [sɛt(ə)us]   'this_F/seven cover(s)'

Southern varieties, at least in their conservative form, pattern differently since a distinction is made between schwa-final and consonant-final forms (Eychenne 2014; Courdès-Murphy 2018). This distinction usually correlates with the pres-ence of an orthographic <e>, which itself reflects the history of the language. Schwa thus appears after *golfe* and *cette* but not *golf* and *sept*. This justifies lexi-cal representations like *cette* /sɛtə/ 'this_F' vs. *sept* /sɛt/ 'seven' in Southern French, as opposed to /sɛt/ for both words in northern varieties, where schwa is consid-ered epenthetic. When realized, morpheme-final schwa in Southern French has a variable quality, including [ə ø œ ɐ ʌ e].

Morpheme-internally, southern and northern varieties again pattern in oppo-site ways. In northern varieties, two categories of schwa, corresponding to <e>, are traditionally distinguished (14).

(14) a.   Unstable vowels (#C_C(C)V):   *genou* [ʒ(ə)nu] 'knee'
      b.   Stable vowels (OL_C):   *brevet* [bʁəvɛ] 'patent'
      c.   Stable vowels (elsewhere):   *requin* [ʁəkɛ̃] 'shark';

Unstable vowels (14a) are found in initial syllables in the context #C_C(C)V. Stable vowels in initial syllables are of two types: the *brevet* type (14b), in which the stability of the vowel is required by the initial obstruent+liquid cluster, and the *requin* type (14c), in which this stability is not segmentally justified, as shown by words like *recours* [ʁ(ə)kuʁ] 'appeal'. Both types have been traditionally called "stable schwas", a categorization that contradicts (11b) and presupposes a binary distinction between, on the one hand, stable and unstable schwas, and, on the other hand, stable schwas and /œ/ and/or /ø/. Both distinctions are questiona-ble.

First, a contrast between stable schwas and /œ/ and/or /ø/ implies a distinct vowel quality for schwa. Marcoux (2018) highlights the fact that schwa does not appear in the same morphological and prosodic context as /œ/ and /ø/, preventing

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[6] A vowel comparable to schwa, but much more variable in quality, frequently surfaces in prepausal position, as in *bonjour* [bɔ̃ˈʒuʁə] 'hi' (Fagyal 2000). This process does not clear-ly fall under the same heading as schwa and is not discussed further here.

a direct comparison of their quality. For instance, the schwa of *genou* (14a) appears in an underived form, while the /œ/ and /ø/ (both spelled <eu>) of *jeunesse* [ʒœnɛs] 'youth' and *jeûner* [ʒøne] 'fast_INF' are derived from *jeune* [ʒœn] 'young' and *jeûne* [ʒøn] 'fast_NOUN'.[7] For the Paris region, Marcoux concludes that schwa and /ø/ cannot be distinguished. In contrast, schwa in Laurentian French is identical to /œ/ (Séguin 2010).

Second, there is no clear contrast between unstable and stable vowels: Corresponding to graphical <e> in the context #C_C there rather is a continuum of "deletability" between vowels that delete most of the time (e.g. in *petit* 'small_M') and those that almost never delete (e.g. in *guenon* 'female monkey'), with dialectal variations (Racine 2007; Marcoux 2018). Establishing a binary distinction between deletable and non-deletable schwas thus appears arbitrary.

The conclusion drawn from these observations is that morpheme-internal (unstable) schwa, as in *genou* and *recours* above, is not a distinct vowel category, but a characteristic of /ø/ or /œ/, which may delete under the right lexical, morphological, segmental, and prosodic context (cf. 4.1.2 and Côté 2008). As a consequence of schwa merging with /œ/ and/or /ø/ (possibly both, given the weakness of the /œ/-/ø/ contrast, cf. 2.1), historical /œ/ or /ø/ may be subject to deletion, as in *peut-être* [p(Œ)tɛtʁ] 'maybe' and *déjeuner* [deʒ(Œ)ne] 'lunch'.

In Southern French, there is no morpheme-internal vowel-∅ alternation[8] and only stable /ø/ appears, as in *genou* [ʒønu] (compare with 14a). Schwa in this variety is essentially morpheme-final, therefore corresponding to a boundary phenomenon.

In conclusion, schwa in northern varieties corresponds to two distinct phenomena: (i) the variable realization of a vowel following a morpheme-final consonant; (ii) the variable, lexically-specific, deletability of morpheme-internal /ø/ and/or /œ/. In contrast, southern varieties display a contrast between schwa-final and consonant-final morphemes, and no morpheme-internal V~∅ alternations.

4.1.2 The distribution of schwa

In northern varieties, the realization of schwa is intimately related to Grammont's (1914/1961) *loi des trois consonnes* 'law of the three consonnes'. Schwa is absent next to a vowel (cf. also 6.3) and it is preferentially realized if it prevents sequences of three of more consonants, essentially in the environment CC_C, as

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[7] Only a few words have /ø/ in the context #C_CV, like *jeudi* [ʒødi] 'Thursday'.

[8] Some exceptional words like *petit* 'small_M' may display a V~∅ alternation, but Courdès-Murphy (2018, 287) argues that they involve suppletion rather than schwa deletion.

opposed to VC_C.[9] Morpheme-finally, the likelihood of schwa realization depends on the type of boundary, the consonantal and prosodic context, and the variety. Six boundary types can be distinguished, as shown in Table 7, where "_" indicates the position of schwa. For instance, "clitic_" refers to the boundary between a clitic and the host it attaches to, clitics being of the [C(ə)] form (i.e., in alphabetical order, *ce, de, je, le, me, ne, que, se, te*). Each boundary type is associated with examples in CC_C and VC_C contexts, including two types of pre-schwa clusters in CC_C: obstruent+liquid and C+obstruent. In each example schwa is taken to be regularly absent, present, or variable, in the standard pronunciation. Although the behavior of schwa is in reality not quite as systematic, the following generalizations emerge.

- Schwa is more likely to surface after two consonants than one: schwa is always at least variable in CC_C, but normally absent in VC_C, except after [C(ə)] clitics (grey cell in Table 7).

- In CC_C, schwa is influenced by the nature of the consonants, obstruent+liquid clusters favoring the realization of schwa (provided they have not already simplified, cf. 5.2).

- In CC_C, schwa is most likely to surface before derivational suffixes and least likely at word boundaries. In the former context, schwa is always realized; in the latter, it is always variable. In the other contexts, schwa appears more sensitive to cluster type.

- In CC_C, schwa is more likely to be realized before monosyllables than polysyllables. This effect is most apparent in compounds, as illustrated by the contrast between *garde-boue* 'mudguard' and *garde-malade* '(home) nurse', the latter also contrasting with *ouvre-bouteille* 'bottle-opener' with respect to cluster type.

Morpheme-internally, deletable vowels are subject to similar constraints as those applying to schwa in clitics.

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[9] VC_CC normally patterns with VC_C in disfavoring the presence of schwa (cf. rightmost column in Table 7). When CC corresponds to liquid+glide, however, schwa tends to be pronounced, as in *goûteriez* [gutəʁje] 'taste_{2PL.COND}'. The presence of schwa is also favored in phrase-initial syllables after a single consonant, a context left aside here.

	CC_C	VC_C
_derivational suffix	*doublement* [dubləmɑ̃] 'double_ADV' *garderie* [ɡaʁdəʁi] 'kindergarden'	*follement* [fɔlmɑ̃] 'mad_ADV'
_inflectional suffix	*doublerai* [dubləʁe] 'double_1SG.FUT' *garderez* [ɡaʁd(ə)ʁe] 'keep_2PL.FUT'	*goûterez* [ɡutʁe] 'taste_2PL.FUT'
prefix_	*entrevoir* [ɑ̃tʁəvwaʁ] 'glimpse_INF' *ex-femme* [ɛks(ə)fam] 'ex-wife'	*vice-doyen* [visdwajɛ̃] 'vice-dean'
between two elements of a compound	*ouvre-bouteille* [uvʁəbutɛj] 'bottle opener' *garde-boue* [ɡaʁdəbu] 'mudguard' *garde-malade* [ɡaʁd(ə)malad] 'nurse'	*lance-pierres* [lɑ̃spjɛʁ] 'catapult'
clitic_	*avec le pot* [avɛkləpo] 'with the_M pot' *avec ce pot* [avɛks(ə)po] 'with that_M pot'	*dans le pot* [dɑ̃l(ə)po] 'in the_M pot'
word_	*l'oncle rit* [lɔ̃kl(ə)ʁi] 'the uncle laughs' *l'orque rit* [lɔʁk(ə)ʁi] 'the orca laughs'	*l'homme rit* [lɔmʁi] 'the man laughs'

Table 7: Distribution of morpheme-final schwa at different boundaries, in CC_C and VC_C.

These generalizations may be modulated across varieties and speech styles, schwa being more frequently realized in formal situations. In the northern domain, some varieties admit the absence of schwa in CC_C even before a derivational suffix, as in *garderie* [ɡaʁdʁi] 'kindergarten' (Morin 1983 for Saint-Etienne; Racine 2007 for Switzerland). In Laurentian French (Côté 2012), schwa is exceptional at word boundaries, except after a handful of words; word-final clusters are instead regularly simplified (cf. 5.2). The reduction of obstruent+liquid clusters may also apply before inflectional suffixes, as in *doublerai* [dubʁe] 'double_1SG.FUT'.

In conservative Southern French, lexical morpheme-final schwas are realized in all contexts except prevocalically, including VC_C (e.g. *cette idée* [sɛtide] 'this_F idea' vs. *cette fois* [sɛtəfwa] 'this_F time', which would normally be realized without schwa in the north). This conservative southern system is however under pressure from the northern one and subject to change. The most notable evolution concerns the deletion of schwa at the end of non-clitic words in preconsonantal or prepausal position (Eychenne 2019). The sentence in (15) would thus have three typical pronunciations.

(15) *Tu   le   jettes   là*   [tylʒɛtla] (Northern)
     you_SG it_M throw_2SG there'   [tyləʒɛtəla] (Southern conservative)
     'you throw it there'   [tyləʒɛtla] (Southern innovative)

The French schwa has given rise to a host of theoretical analyses in all major phonological frameworks, including classical generative phonology (Dell 1985), syllable-based non-linear phonology (e.g. Noske 1993), and constraint-based approaches (from Côté 2000 to Smith/Pater 2020). The formal challenge lies in

the interaction between morphological, segmental, and prosodic factors and in the modeling of variation, which has been the focus of recent research.

4.2   Liaison

French liaison stands among the most celebrated sound processes in languages of the world. It is typically described as the realization of a final orthographic consonant in so-called liaison contexts. For example, *gros* 'big_M' alternates between [gʁo] in non-liaison contexts and [gʁoz] in liaison contexts. A linguistically informed definition, however, should avoid referring to spelling, as liaison consonants (LC) do not always correspond to orthographic consonants and are not necessarily interpreted as word-final. Liaison is therefore defined here as the realization of a consonant at certain word boundaries, as in (16a), as opposed to (16b–d), where *gros* appears in utterance-final position (16b), before a consonant-initial word (16c), or in a syntactic configuration that excludes liaison (16d). In liaison contexts, the preceding and following words are referred to as W1 and W2 (e.g. *gros* and *outil* in 16a).

(16)   a.   *gros outil*   [gʁozuti]   'big_M tool'
       b.   *l'outil est gros*   [lutiɛgʁo]   'the tool is big_M'
       c.   *gros marteau*   [gʁomaχto]   'big_M hammer'
       d.   *le gros est derrière* [ləgʁoɛdɛʁjɛʁ]   'the_M big one is behind'

LCs are essentially [n], [z], [t], which account for more than 99% of all LCs observed in speech (Mallet 2008). Liaison may apply categorically or variably, depending on the context. The basic segmental condition for the realization of LCs is the presence of a following vowel or glide (cf. 6.3 for exceptions); the more complex lexical, syntactic, and prosodic constraints are taken up in 4.2.1.

When realized, LCs normally attach to the following vowel; the example in (16a) would thus be syllabified [gʁo.zu.ti]. In formal speech styles, LCs may also appear in the coda of the preceding word, a process called liaison without *enchaînement* (Encrevé 1988; Laks 2014), which is virtually absent in conversational French (Durand/Lyche 2008; Durand et al. 2011).

Historically, LCs were stable final consonants, which ceased to be pronounced in a growing set of environments between the 12th and the 16th centuries. They remained only in some prevocalic contexts, giving rise to what is known now as liaison. Do LCs still belong to the preceding word, as traditionally accepted, or have they been diachronically reanalyzed? The lexical and phonological status of LCs, a key analytical issue raised by liaison, is addressed in 4.2.2.

Liaison has been the topic of much recent research, which has complemented the phonological perspective with insights from related areas, including phonetics, acquisition, psycholinguistics, and corpus linguistics (cf. Côté 2011; Durand

et al. 2011; Soum-Favaro/Coquillon/Chevrot 2014; Barreca 2015; Eychenne/Laks 2017; Smolensky/Rosen/Goldrick 2020 for surveys and new research directions).

4.2.1 Contexts and factors

Liaison applies categorically in the contexts in (17), limited to nominal and verbal clitics: determiner+noun/adjective (17a), within the proclitic+verb group (17b), and within the verb+enclitic group (17c) (Durand/Lyche 2008; Mallet 2008; Barreca 2015). In each context, the first example, with liaison before a vowel-initial word, contrasts with an example without liaison before a consonant. Liaison also applies categorically in a closed set of compounds and fixed expressions, like *accent aigu* 'acute accent' [aksɑ̃tegy] and *moins en moins* 'less and less' [mwɛ̃zɑ̃mwɛ̃], which may be considered lexicalized.

(17)	a.	*un ami*	[ɛ̃nami]	'a$_M$ friend'
		un mari	[ɛ̃maʁi]	'a$_M$ husband'
	b.	*vous avez*	[vuzave]	'you$_{PL}$ have$_{2PL}$'
		vous pouvez	[vupuve]	'you$_{PL}$ can$_{2PL}$'
	c.	*parlez-en*	[paʁlezɑ̃]	'speak$_{IMP.2PL}$ of it'
		parlez-lui	[paʁlelɥi]	'speak$_{IMP.2PL}$ to him/her'

Variable liaison is found in a wider variety of contexts, which involve three categories of triggers: closed lexical categories (18), the plural (19), and verbs (20). Closed categories include prepositions (18a), conjunctions (18b), the relative pronoun *dont* (18c), adverbs (18d), and masculine singular prenominal adjectives (18e). The plural category involves prenominal adjectives (19a) and nouns followed by adjectives (19b); liaison is regular in the first case (19a), but rare in conversational speech after plural nouns (19b). Verbs (20) include different forms, finite and non-finite, but productive liaison is largely limited to auxiliary forms of *être* 'be$_{INF}$' (20b) and, to a much lesser extent, *avoir* 'have$_{INF}$'.

(18)	a.	*dans une année*	[dɑ̃(z)ynane]	'in a$_F$ year'
	b.	*mais elle a réussi*	[mɛ(z)ɛlaʁeysi]	'but she has succeeded'
	c.	*dont il parle*	[dɔ̃(t)ilpaʁl]	'of which he speaks'
	d.	*très utile*	[tʁɛ(z)ytil]	'very useful'
	e.	*grand ami*	[gʁɑ̃(t)ami]	'big$_{M.SG}$ friend'
(19)	a.	*nouvelles idées*	[nuvɛl(z)ide]	'new$_{F.PL}$ ideas'
	b.	*maisons isolées*	[mɛzɔ̃(z)izɔle]	'house$_{PL}$ isolated'
(20)	a.	*elle allait à Paris*	[ɛlalɛ(t)apaʁi]	'she went to Paris'
	b.	*Luc est ici*	[lykɛ(t)isi]	'Luc is here'

Adverbs (18d) do not strictly speaking form a closed lexical class, but they involve a finite number of elements: a small set of specific forms (e.g. *très* 'very') and the suffix *-ment* '-ly', which serves to derive all other adverbs. Prenominal adjectives can be considered to belong to a semi-closed set, as adjectives appear by default post-nominally in French and prenominal ones are lexically marked. In the plural (19a), any adjective used prenominally is likely to trigger liaison; in the singular, liaison is possible with only a small number of masculine forms (18e).

The grammatical configurations in (17–20) define the range of possible liaison contexts. Elsewhere liaison is normally excluded, for example after a singular noun (e.g. *plat italien* [pla(*t)italjɛ̃] 'meal Italian$_M$') or between a noun and a verb (e.g. *les garçons arrivent* [legaχsɔ̃(*z)aʁiv] 'the$_{PL}$ boy$_{PL}$ arrive$_{3PL}$') (Durand/Lyche 2008, 46). But within a given configuration, the frequency of liaison realization may vary considerably depending on the lexical item. For example, it is almost categorical after *très* 'very' but very rare after *pas* 'not' (adverbs, 18d), more frequent after *petit* 'small$_{M.SG}$' than after *grand* 'tall$_{M.SG}$' (adjectives, 18e) (Mallet 2008; Barreca 2015). This fact challenges strictly structural accounts of liaison, in which liaison is activated in specific syntactic or prosodic contexts (cf. Côté 2011 for a review). Other explanatory factors include frequency (Bybee 2005) and transitional probability (Côté 2013): liaison realization is correlated with the frequency of W1 (e.g. liaison is more likely after *est* 'be$_{3SG}$' than *sont* 'be$_{3PL}$'), the frequency of cooccurrence of W1 and W2 (e.g. liaison is categorical in highly frequent combinations like determiner+noun), and transitional probability between W1 and the category of W2 (e.g. liaison is productive after *très* 'very', which almost systematically precedes an adjective, but not after *pas* 'not', which appears in a variety of syntactic configurations). The length of W1 is also relevant, as liaison is significantly more frequent after monosyllables than polysyllables (e.g. more likely after *sont* 'be$_{3PL}$' than *était* 'be$_{3SG.IMPF}$', even though the latter is twice as frequent; Durand et al. 2011). The likelihood of liaison in any given context is thus conditioned by a variety of factors and a global predictive account has remained elusive.

Like schwa, liaison is sensitive to speech style and is more frequent in formal settings. Liaison is not traditionally considered a salient dialectal feature, but the PFC project has revealed important regional characteristics outside Europe (Côté 2017), like the absence of variable liaison in Louisiana French and its reduced general frequency in African varieties. But it is Laurentian French that displays the widest range of specific features, including variable liaison in [l] after *ça* 'this' (e.g. *ça arrive* [sa(l)aʁiv] 'it happens'), the generalization of liaison [t] with all forms of *être* 'be$_{INF}$' in the present tense (e.g. *tu es ici* [t(y)e(t)isi] 'you$_{SG}$ are here'), and the absence of liaison after *ils* 'they' (e.g. *ils arrivent* [jaʁiv] 'they arrive', as opposed to the standard form [i(l)zaʁiv]).

4.2.2 The lexical status of liaison consonants

Independently from the contextual factors that condition the realization of liaison, the status of LCs, in particular with respect to the preceding and following words, has been hotly debated. LCs systematically appear between two words and their lexical affiliation is contentious due to contradictory evidence that links them to W1, W2, or neither of these.

LCs are related to W1 in that it is W1 that establishes which LC, if any, is allowed. For instance, the prepositions *dans* [dɑ̃] 'in', *en* [ɑ̃] 'in', and *moyennant* [mwajɛnɑ̃] 'by means of', all ending in [ɑ̃], respectively trigger liaison in [z], [n], and [t]. Singular prenominal adjectives also highlight the correspondence between liaison and morphological derivation, which typically involves the same consonant (note, however, that most liaison-triggering words are not involved in derivation). For example [t] appears in liaison and derivation with *petit* [p(ə)ti] 'small$_{M.SG}$': *petit ours* [p(ə)tituʁs] 'small$_{M.SG}$ bear', *petitesse* [p(ə)titɛs] 'smallness'. But this correspondence is not necessary, as different (non-standard) LCs are attested, as in *gros enfant* [gʁotɑ̃fɑ̃] 'big$_{M.SG}$ child' with liaison in [t] (Morin 2003). Derivation, however, remains untouched, as in *grosseur* [gʁosœʁ] 'size' with [s].

LCs are linked to W2 phonetically and prosodically. This conclusion relies on a comparison between LCs, stable final consonants, and initial consonants in the same environment, as illustrated in (21) with [t]. LCs normally syllabify with the following vowel; they are very similar to initial consonants but clearly distinguishable from stable final consonants, notably in the duration of the consonant and the preceding vowel (e.g. Delattre 1940; Nguyen et al. 2007). In addition, when a strong prosodic boundary intervenes between W1 and W2, final consonants systematically precede it, but LCs tend to follow it. This can be observed in parentheticals (22a–b) or with hesitations (22c–d).[10]

(21)	a.	LC:	*maudit ami*	[moditami] 'damned$_{M.SG}$ friend'
	b.	Final C:	*maudite amie*	[moditami] 'damned$_{F.SG}$ friend'
	c.	Initial C:	*maudit tamis*	[moditami] 'damned$_{M.SG}$ sieve'

(22)	a.	*un pauvre, mais grand, abri*	[œ̃povʁ|mɛgʁɑ̃|tabʁi]
		'a$_M$ poor, but large$_{M.SG}$, shelter	
	b.	*une pauvre, mais grande, église*	[ynpovʁ|mɛgʁɑ̃d|egliz]
		'a$_F$ poor, but large$_{F.SG}$, church'	

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[10] The example in (22c) comes from the PFC-Québec corpus (Côté 2014). A survey of potential LCs with *euh* in this corpus shows that LCs may also be left unrealized or appear before the hesitation vowel, but only exceptionally in this case. By contrast, final consonants like in (22d) cannot follow the hesitation vowel.

    c.   *ton petit euh, exercice*   [tɔ̃ptiœː|tɛgzɛχsis]
          'your_M.SG small_M.SG hmm, exercise'
    d.   *ta petite euh, excursion*   [taptitœː|ɛkskyχsjɔ̃]
          'your_F.SG small_F.SG hmm, excursion'

The link between LCs and W2 is reflected in acquisitional data (Chevrot/Dugua/Fayol 2009): children appear to initially interpret LCs as word-initial and later go through a stage of possible confusion between LCs and initial consonants. The initial [z] of *zèbre* [zɛbʁ] 'zebra' can thus be treated as a LC, but no comparable confusion emerges between LCs and final consonants.

    LCs may also become semantically autonomous from W1 and W2, in particular in the case of liaison [z] in plural constructions. The LC may thus acquire an independent morphemic status. The use of this new plural morpheme can then generalize beyond liaison contexts, as in (23), from Côté (2011, 2695).

(23)   a.   *c'est quoi comme arbres?* [sekwakɔmzaʁbʁ]
           'it is what as trees?'
      b.   *ces parents si incompréhensibles* [sepaʁɑsizɛ̃kɔ̃pχeɑ̃sibl]
           'those parents so incomprehensible'

These contradictory arguments, which link LCs to W1 or W2, or make them autonomous from both W1 and W2, have naturally led to competing analyses of their lexical status: word-final, word-initial, morphemic, or part of larger constructions (cf. Côté 2011 for a review and Smolensky/Rosen/Goldrick 2020 for a new proposal). The traditional account considers LCs to be word-final, in line with their historical origins. This raises the question of how to distinguish LCs, which only surface in some prevocalic contexts, from stable final consonants, e.g. *très* 'very', pronounced [tʁɛz] in liaison contexts and [tʁɛ] otherwise, vs. *treize* 'thirteen', always pronounced [tʁɛz]. Answers to this question, and to the larger issue of the status of LCs, depend in part on one's conception of the lexicon, the representation of segments, the role of the syllable, and even what is considered valid evidence.

5   The syllable

The syllable in French is relatively complex, given the large number of syllable types and consonant clusters attested in various positions (5.1). Final clusters are, however, frequently simplified, a process subject to dialectal variation (5.2). The syllabification of intervocalic clusters is addressed in 5.3.

5.1   Syllable types

Codas and onsets may be empty, simple, or complex and only vowels are admitted as nuclei. Table 8 shows the proportion of different syllable types.[11] French displays a strong preference for open syllables (73% of syllables have null codas) and simple onsets (85%).

	Null onset	Simple onset	Complex onset
Null coda	V: 8%	CV: 54%	(C)CCV: 11%
Simple coda	VC: 2%	CVC: 18%	(C)CCVC: 3%
Complex coda	VCC(C): 0.5%	CVCC(C)(C): 3%	(C)CCVCC(C): 0.5%

Table 8: Proportions of different syllable types in French (Rousset 2004, 116).

All consonants (disregarding glides) are allowed in simple onsets and codas, with the exception of word-initial /ɲ/ in some varieties (Dell 1995). Clusters display elements of both symmetry and asymmetry between onsets and codas. In both positions, the most frequent types of consonant clusters are obstruent+liquid (OL) (24a), possibly preceded by /s/ (24b), and /s/+plosive (24c). While OL clusters are expected in onset position, their frequency in coda position, which results from the historical deletion of final vowels, is typologically exceptional. In onsets, only sequences of non-falling sonority are otherwise attested, considering the following sonority hierarchy: obstruents<nasals<liquids (25). All liquid- and nasal-initial sequences are thus excluded. Codas are more permissive and allow all binary combinations of a liquid, a nasal, a fricative, and a plosive (Dell 1995; Côté 2004); the more frequent ones are exemplified in (26).[12] Codas also display more variability than onsets in clusters of more than two consonants: whereas only /s/ can appear as the initial segment of three-consonant onsets (24b), three-consonant codas may also start with a liquid or a plosive (27). One four-consonant coda is attested: /kstʁ/ in *ambidextre* /ɑ̃bidɛkstʁ/ 'ambidextrous'.

(24) a. OL: plosive+liquid (except /tl/, /dl/) and /f/, /v/+liquid:
          <u>onset</u>:   *vrai* /vʁɛ/ 'true'   *oubli* /u.bli/ 'oversight'
          <u>coda</u>:   *souffle* /sufl/ 'breath'   *entre* /ɑ̃tʁ/ 'between'
      b. /s/OL: <u>onset</u>: *strie* /stʁi/ 'streak'   <u>coda</u>: *astre* /astʁ/ 'star'
      c. /s/+plosive: <u>onset</u>: *sport* /spɔʁ/ 'sport'   <u>coda</u>: *vaste* /vast/ 'vast'

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[11] Those proportions, based on a syllabified lexicon, would vary slightly in continuous speech, due to a number of sandhi processes affecting syllabification (cf. 6.3). A few word-internal consonant clusters are also compatible with different syllabic segmentations.

[12] However, sequences of a coronal fricative followed by a non-plosive are more restricted in coda than in onset: /sf/, /sn/, /sl/, /sʁ/ are attested only in onset, e.g. *sphère* (25c).

(25) Other onsets:
    a.   plosive+nasal: *pneu*   /pnø/   'tire'
    b.   plosive+fricative: *psychologie* /psikɔlɔʒi/ 'psychology'
    c.   fricative+fricative: *sphère*   /sfɛʁ/   'sphere'

(26) Other CC codas:
    a.   plosive+plosive: *apte*   /apt/   'apt'
    b.   obstruent+nasal: *prisme*   /pʁism/   'prism'
    c.   plosive+fricative: *taxe*   /taks/   'tax'
    d.   liquid+C: *corne*   /kɔʁn/   'horn'

(27) Other CCC codas:
    a.   *arbre*   /aʁbʁ/   'tree'
    b.   *verste*   /vɛʁst/   'verst'
    c.   *spectre*   /spɛktʁ/   'specter'

5.2 Final cluster simplification

The complexity of word-final clusters leads to their regular simplification, especially in informal speech. But the relative frequency of simplification, its contexts of application, and the set of clusters involved differ across varieties. Considering only the last two consonants and with the exception of a few marginal cases, final clusters can be divided into three groups with respect to simplification (28).

(28)   a.   OL (24a)   *table* [tab(l)] 'table'
    b.   Obstruent+nasal or plosive (24c, 26a, b) *liste* [lis(t)] 'list'
    c.   Other clusters (especially 26c, d)   *taxe* [taks], *corne* [kɔʁn]

OL clusters (28a) are the most frequent and the most susceptible to simplification, by deletion of the final liquid. Final deletion in clusters of the second group (28b) is possible, but less regular and restricted to some varieties. The last group (28c) comprises clusters that are essentially stable. Reduction is most frequent in pre-consonantal position, but also well attested prepausally and prevocalically.

To illustrate the diversity of configurations with respect to cluster simplification, Table 9 indicates the rates of cluster reduction in four areas, distinguishing the three groups in (28) in prevocalic and preconsonantal position. These numbers are based on codings from the PFC corpus[13] (www.projet-pfc.net; Durand/Laks/Lyche 2002), which indicate the occurrence of final cluster reduction; only the conversations were considered and each region is represented by two PFC survey points: Northern France (Brécey, Puteaux-Courbevoie), Switzerland

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[13] The word *parce que* [paʁsk(ə)] 'because' was excluded due to its specific behavior.

(Neuchâtel, Nyon), Québec (Saguenay, Trois-Rivières), Southern France (Aix-Marseille, Lacaune).

Southern France, due to the regularity of word-final schwa (cf. 4.1.2), largely escapes cluster reduction, exceptions targeting in particular some preconsonantal OL clusters. The other (all northern) varieties display productive liquid deletion in preconsonantal OL clusters, ranging from 62% in Switzerland to 99% in Québec. They otherwise differ with respect to prevocalic deletion and the simplification of the clusters in (28b). In northern France, liquid deletion is well established prevocalically (38%), but clusters in the (28b) group never simplify. Switzerland allows the reduction of plosive-final clusters (28b) preconsonantally (28%), but excludes prevocalic deletion even for OL clusters. Québec displays by far the highest rates of simplification, for both types of reducible clusters and in prevocalic as well as preconsonantal position (cf. Côté 2004) (29).

(29) a.　(28a), _C:　*quatre filles*　　[katfɪj]　　'four girls'
　　b.　(28a), _V:　*quatre ou cinq*　[katusɛ̃k]　'four or five'
　　c.　(28b), _C:　*juste mes trucs*　[ʒʏsmetʁʏk] 'only my_PL things'
　　d.　(28b), _V:　*juste un niveau*　[ʒʏsœ̃nivo]　'only a_M level'

		Northern France	Switzerland	Québec	Southern France
_C	(28c)	0% (N = 46)	0% (N = 98)	0% (N = 80)	0% (N = 45)
	(28b)	0% (N = 23)[14]	28% (N = 61)	84% (N = 49)	0% (N = 19)
	(28a)	74% (N =103)	62% (N =266)	99% (N =214)	11% (N = 82)
_V	(28c)	0% (N = 13)	0% (N = 34)	0% (N = 29)	0% (N = 27)
	(28b)	0% (N = 15)	0% (N = 24)	70% (N = 10)	6% (N = 34)
	(28a)	38% (N = 48)	6% (N = 79)	85% (N = 73)	

Table 9: Percentages of final consonant deletion in four areas, before consonants and vowels.

5.3　The syllabification of internal clusters

Issues arise with respect to the syllabification of word-internal consonant sequences between codas and onsets. Two principles apply systematically (30) and variability in syllabification is observed in the cases in (31).

(30) a.　Prevocalic single consonants and OL clusters (24a) are onsets:
　　　　épée [e.pe] 'sword'　　　　*écran* [e.kχɑ̃] 'screen'
　　b.　Post-vocalic sonorants (liquids, nasals) are codas preconsonantally:
　　　　Hamlet [am.lɛt] (proper name)　*poltron* [pɔl.tχɔ̃] 'coward'

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[14] This count excludes two occurrences of [t] coded as deleted before another coronal plosive.

(31) a. obstruent+sonorant sequences other than those in (24a):
    athlète [at.lɛt]~[a.tlɛt] 'athlete'   *apnée* [ap.ne]~[a.pne] 'apnea'
   b. (liquid+)obstruent(+[s])+obstruent(+liquid):
    accès [ak.sɛ]~[a.ksɛ] 'access'   *esprit* [ɛs.pχi]~[ɛ.spχi] 'spirit'
    obstacle [ɔps.takl]~[ɔp.stakl] 'obstacle'

Dell (1995) suggests, on the basis of distributional regularities within consonant sequences, that post-vocalic consonants are always syllabified as codas if no conflict arises with respect to (30) and codas are limited to one consonant. The words in (31) would thus all be syllabified with one coda consonant. But this rule appears too strict. Laeufer's (1991) auditory and spectrographic analysis of experimental results indicates variability in syllabification for the sequences in (31), with more onset consonants in fast speech than in slow speech. Likewise, Azra/Cheneau (1994) and Plénat (1995) suggest that obstruent+obstruent sequences may be syllabified as complex onsets in words like *accès* and *esprit* (31b). Their argument rests on data from verlan, a language game in which words are created by inverting syllables in the original French form (hence *verlan* [vɛʁlɑ̃], from *l'envers* [lɑ̃vɛʁ] 'the reverse'). Words like *mystique* [mistik] 'mystic' tend to be transposed as [stik.mi], indicating a syllabification with a complex onset and no coda [mi.stik]. The factors involved in the variable syllabification of the clusters in (31) include sonority sequencing, phonotactic restrictions at word edges, and speech rate (Laeufer 1991), but they remain to be clarified.

6   The word

The word is considered here from two points of view. Sections 6.1 and 6.2 first discuss segmental and prosodic aspects involved in word formation: morphophonological alternations in derivation and prosodic morphology. Sandhi processes applying at word boundaries, and exceptions to them, are reviewed in 6.3.

6.1   Morphophonological alternations

Morphological inflection and derivation in French involve a large number of segmental alternations, which are involved in four contexts: masculine-feminine and singular-plural distinctions in the nominal and adjectival domain, verbal conjugations, and derivational morphology. The alternations fall into three main types: consonantal (C~$\emptyset$), nasal (VN~$\tilde{\text{V}}$), and vocalic (V$_1$~V$_2$). A number of other alternations are grouped in the "other" category. Table 10 provides examples of each combination of context and type.

These alternations are analyzable in different ways, from the most abstract to the most concrete, depending on the productivity and regularity of each alternation and one's theoretical model. One issue is whether the alternations are phonological, morphological, or lexical in nature. Abstract derivational proposals have been applied in particular to the consonantal and nasal types, which are also related to liaison (cf. 4.2). One form of each alternation is obtained from the other by the application of phonological rules. For instance, *bon* [bɔ̃] 'good_M' may be derived from /bɔn/ through processes of vowel nasalization before a coda nasal and final consonant deletion (in that order), which do not apply in derived forms like *bonnement* 'good_{ADV}'; cf. Ayres-Bennet/Carruthers (2001) for a review of nasal alternations and the problems raised by this type of approach, including the underlying or derived status of nasal vowels. Other, less abstract options include the use of suppletive forms (e.g. *bon-* /bɔ̃/, /bɔn/) and more general morphological correspondences between nasal vowels and corresponding VN sequences.

	Masc-fem	Singular-plural	Verbs	Derivation
C~Ø	*grand~grande* [gʁɑ̃]~[gʁɑ̃d] 'big_{M~F}'	*œuf~œufs* [œf]~[ø] 'egg_{SG~PL}'	*dit~disent* [di]~[diz] 'say_{3SG~3PL}'	*grand~grandir* [gʁɑ̃]~[gʁɑ̃diʁ] 'big_M~grow_{INF}'
VN~Ṽ	*bon~bonne* [bɔ̃]~[bɔn] 'good_{M~F}'	---	*vient~viennent* [vjɛ̃]~[vjɛn] 'come_{3SG~3PL}'	*bon~bonnement* [bɔ̃]~[bɔnmɑ̃] 'good_M~good_{ADV}'
V₁~V₂	*mon~ma* [mɔ̃]~[ma] 'my_{M~F}'	*monsieur~messieurs* [m(ə)sjø]~[mesjø] 'sir_{SG~PL}'	*peut~pu* [pø]~[py] 'can_{3SG~PST.PTCP}'	*sel~saler* [sɛl]~[sale] 'salt~salt_{INF}'
Other	*neuf~neuve* [nœf]~[nœv] 'new_{M~F}'	*ciel~cieux* [sjɛl]~[sjø] 'sky_{SG~PL}'	*faut~faille* [fo]~[faj] 'must_{3SG~3SG.SUBJ}'	*école~scolaire* [ekɔl]~[skɔlɛʁ] 'school~school_{ADJ}'

Table 10: Morphophonological alternations in derivation.

6.2   Prosodic morphology

Prosodic morphology is concerned with word formation processes that are governed by specific prosodic constraints. These include reduplication, truncation, and acronyms (Scullen 1993). Reduplicated forms obey strict conditions: they are disyllabic and the first syllable is consonant-initial and open.[15] If the base word corresponds to a single open syllable, that syllable is simply reduplicated (32a). If the syllable is closed, only its CV part is copied to the left (32b). If the base word is polysyllabic, either the first or the last syllable may be reduplicated (compare

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[15] The last constraint is exceptionally violated, as in *cache-cache* [kaʃkaʃ] 'hide-and-seek'.

32c and 32d); the latter option is systematic with vowel-initial words (32e). Vowel quality may be adapted to conform to distributional restrictions, as in (32c).

(32) a.   *fou*   'crazy$_M$'   [fu]   →   [fufu]
      b.   *folle*   'crazy$_F$'   [fɔl]   →   [fɔfɔl]
      c.   *joli*   'nice'   [ʒɔli]   →   [ʒoʒo]
      d.   *biscuit*   'cookie'   [biskɥi]   →   [kɥikɥi]
      e.   *Annette*   (proper name)   [anɛt]   →   [nɛnɛt]~[nenɛt]

Truncated forms are of two types: simple (33a, b) and suffixal (33c, d).

(33) a.   *cinéma*   'cinema'   [sinema]   →   [sine]
      b.   *conférence* 'conference'   [kɔ̃feʁɑ̃s] →   [kɔ̃f]
      c.   *colonie*   'summer camp'   [kɔlɔni]   →   [kɔlo]
      d.   *apéritif*   'aperitif'   [apeʁitif] →   [apeʁo]

Suffixal truncation most often involves a final [o] (cf. Scullen 1993 for other suffixes), which can be interpreted either as a suffix, as in [apeʁo] (33d), or as a segment from the base word, as in *colonie* (33c). Excluding [o], truncated forms display a limited set of syllabic patterns – CVC, CV(C).CV(C), CV.CV.CV – with a strong preference for mono- or disyllabic forms and the constraint that monosyllables end in a consonant, as in (33b).[16] Two conditions seem to be at work: a minimal word condition, whereby a word contains at least two moras[17] (which excludes CV forms), and an optimal word condition, according to which a word contains one binary foot (defined by moras or syllables).

Acronyms (Scullen 1993; Plénat 1993; 1998) may be read letter by letter or as words, depending on a complex interplay of segmental and prosodic factors. In order to be read as a word an acronym must be "pronounceable". This requires at least a vowel, so acronyms containing only consonants are spelled out (34a). The main tendencies otherwise appear to follow from three general principles. (i) The optimal word is disyllabic. As a result, two-letter acronyms are spelled (34b). The proportion of read acronyms then rises with the number of letters, spelling deviating more and more from the optimal disyllable. (ii) The optimal syllable has an onset. This principle applies more strictly to read acronyms and explains the greater tendency for vowel-initial acronyms (34c) and those containing vowel sequences (34d) to be spelled. (iii) Complex onsets follow the markedness hierarchy OL<[sC]<other (cf. 24, 25). In three-letter acronyms, all OL sequences may

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[16] Rare exceptions involve a complex onset: *psychologue* [psikɔlɔg] → [psi] 'psychologist'.

[17] A mora is a unit of syllabic weight, which has no apparent role in French outside of prosodic morphology.

be read (34e), [sC] is variably spelled (34f) or read (34g), and more marked on-sets are spelled (34h), but may only be read in longer acronyms (34i).

(34) a. CGT [seʒete] (Confédération Générale du Travail)
      b. SA [ɛsa] (Société Anonyme)
      c. OPA [opea] (Offre Publique d'Achat)
      d. RAU [ɛʁay] (République Arabe Unie)
      e. CLA [kla] (Centre de Linguistique Appliquée)
      f. SPA [ɛspea] (Société Protectrice des Animaux)
      g. SCO [sko] (Sporting Club Olympique)
      h. CNU [seɛny] (Conseil National des Universités)
      i. CNIT [knit] (Conseil des Nouvelles Industries et Technologies)

The interest of prosodic morphology lies in its revealing hidden preferences in the phonology of French: (i) a minimal word constraint, which prevents CV trunca-tions and acronyms; (ii) an optimal word condition, which favors disyllables in both of these processes as well as reduplication; (iii) a preference for onsetful syllables, which bans vowel-initial reduplicative forms and disfavors the reading of acronyms with initial vowels or vowel sequences. Analyses of these processes also highlight the role of binarity, at the level of moras, syllables, or feet.

6.3   Boundaries and disjunction

The status of the word in French has been notoriously contentious. It is common-ly claimed that the (grammatical) word has no phonetic identity, as word bounda-ries tend to be blurred by a number of processes. These processes create alterna-tions of consonants and vowels at word boundaries, by selecting vowel-final vari-ants before consonant-initial words and consonant-final variants before vowel-initial words. They apply most systematically between clitics and their nominal or verbal host, but also between non-clitic words. Table 11 provides a summary.

	Before consonant-initial words	Before vowel-initial words
a. V~Ø (clitics)	*la fille* [lafij] 'the_F girl'	*l'idée* [lide] 'the idea'
	le mot [l(ə)mo] 'the_M word'	*lours* [luʁs] 'the bear'
	tu dors [tydɔʁ] 'you_SG sleep'	*tu as* [t(y)a] 'you_SG have'
b. [l]~Ø (clitics)	*il va* [i(l)va] 'he goes'	*il arrive* [ilaʁiv] 'he arrives'
	elle va [ɛ(l)va] 'she goes'	*elle arrive* [ɛlaʁiv] 'she arrives'
c. Schwa (non-clitics)	*reste là* [ʁɛst(ə)la] 'stay there'	*reste ici* [ʁɛstisi] 'stay here'
	arrête là [aʁɛtla] 'stop there'	*arrête ici* [aʁɛtisi] 'stop here'
d. Liaison	*les mots* [lemo] 'the_PL words'	*les hôtes* [lezot] 'the_PL guests'
	gros chien [gʁoʃjɛ̃] 'big_M dog'	*gros ours* [gʁo(z)uʁs] 'big_M bear'

e. Suppletion	*ma peau* [mapo] 'my_F skin'	*mon eau* [mɔ̃no] 'my water'
	vieux mot [vjømo] 'old_M word'	*vieil hôte* [vjɛjot] 'old guest'
f. *Enchaînement*	*quel mot* [kɛl.mo] 'which word'	*quel hôte* [kɛ.lot] 'which guest'

Table 11: Sandhi processes distinguishing vowel-initial and consonant-initial words.

Clitics are subject to V~Ø and C~Ø alternations (Table 11, examples a, b). Vowel elision refers to the omission of the vowel in CV clitics followed by vowel-initial words: it is categorical in /Cə/ clitics and in *la* 'the_F/her', and variable (in informal speech) in *tu* 'you_SG'. Unlike /a/ and /y/, however, the presence of schwa before a consonant is not systematic. In the clitics *il* 'he' and *elle* 'she', /l/ is variably omitted before consonants. At the end of non-clitic words (Table 11, example c), schwa is also absent before vowel-initial words, but its presence before a consonant is more restricted than in clitics. Liaison (Table 11, example d; cf. 4.2) is systematic after clitics (e.g. *les* 'the_PL/them') but variable after non-clitic categories (e.g. *gros* 'big_M'). Suppletion (e) applies to both clitics and non-clitic words, which have a consonant-final (or liaison-triggering) variant before vowels and a vowel-final variant before consonants. Finally, *enchaînement* refers to the resyllabification of word-final consonants in the onset of a following word-initial vowel, as in *quel hôte* 'which guest' /kɛl#ot/ [kɛ.lot]. This process disrupts the correspondence between syllable and word boundaries in C#V contexts.

Despite the processes in Table 11, Durand/Eychenne (2014) argue that there remain several segmental and prosodic cues to word boundaries. For example, *des blocages* 'some blockings' and *déblocage* 'unblocking' are both pronounced [deblɔkaʒ], but with a different prosodic pattern: the [e] of the determiner in *des blocages* is less prominent than the initial [e] of *déblocage*, articulated with less intensity and a lower F0. With respect to resyllabification, Fougeron (2007) also shows that it is far from systematic and there is no neutralization between final (resyllabified) consonants and initial consonants. In other words, the sequence [ita] in *petite amie* /pətit#ami/ 'little_F friend_F' remains different from that in *petit tamis* /pəti#tami/ 'small_M sieve' – even though both could be transcribed [pə.ti.ta.mi] – due to durational and spectral differences between the two consonants and their surrounding vowels.

The sandhi processes in Table 11 can however be blocked before vowels, a phenomenon known as disjunction. Disjunction may apply before any vowel-initial word in specific contexts, notably in autonymic uses (e.g. *le "ami" dans ce texte* [ləamidɑ̃s(ə)tɛkst] 'the_M "friend" in this_M text'). But it is regular with a specific class of words, called *h aspiré*, which begin phonetically with a vowel but do not pattern with regular vowel-initial words with respect to the processes in Table 11, as shown in (35). For example, liaison applies as expected in *les eaux* [lezo] 'the_PL waters', but not in *les hauts* 'the_PL tops' (35c). Historically, these words, borrowed from medieval Germanic dialects, were pronounced with a consonantal [h]. This consonant later ceased to be realized in most varieties of French

(cf. 3.1), but the words have retained their consonantal behavior. The phenomenon has since evolved in two directions: some *h aspiré* words have tended to regularize to normal vowel-initial words, but the class has also attracted new lexical categories that were not historically [h]-initial, notably letters[18], numbers, and proper names.

In most respects, *h aspiré* words pattern with consonant-initial ones, but two differences emerge. First, schwa is more often realized before *h aspiré* than before consonants. In clitics schwa is variably omitted before consonants (e.g. *dans le mot* [dãl(ə)mo] 'in the_M word'), but generally not before *h aspiré* (e.g. *dans le haut* [dãləo] 'in the_M top'). At the end of non-clitic words, schwa in northern varieties is usually not realized after one consonant (e.g. *douze mots* [duzmo] 'twelve words'), but a following *h aspiré* word allows the retention of schwa (35b). Second, while *enchaînement* never applies before consonants, it is variable before *h aspiré* (35e). When *enchaînement* does not occur, a glottal plosive tends to be inserted.

(35)	a.	Vowel elision:	*la hausse*	[laos]	'the_F rise'
			le haut	[ləo]	'the_M top'
			tu harcèles	[tyaʁsɛl]	'you_SG harrass'
	b.	Schwa:	*douze hauts*	[duz(ə)o]	'twelve tops'
	c.	Liaison:	*les hauts*	[leo]	'the_PL tops'
	d.	Suppletion:	*ma hausse*	[maos]	'my_F rise'
			vieux haut	[vjøo]	'old_M top'
	e.	*Enchaînement*:	*quel haut*	[kɛl.(ʔ)o]	'which top'
			quel héros	[kɛ.le.ʁo]	'which hero'

While the above summarizes the main empirical generalizations pertaining to *h aspiré*, corpus studies reveal more variability. Vowel elision is indeed systematically blocked before *h aspiré* words, but liaison is occasionally realized (e.g. *un handicap* [ɛ̃nãdikap] 'a_M handicap') and *enchaînement* is in fact the norm, as it applies in 92% of potential cases (Göhring 2017). As to the representation of *h aspiré* words, it has led to multiple proposals, based on lexical diacritics, some initial consonant that eventually deletes, or an empty syllabic onset; cf. Gabriel/Meisenburg (2009) for a review and a proposal that incorporates the observed variability in the realization of *h aspiré* words.

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[18] Interestingly, while all individual letters with a vowel-initial name involve disjunction (e.g. *le O et le S* [ləoeləɛs] 'the O and the S'), only consonant letters remain disjunctive as the initial letter of acronyms that are spelled out, as in *la RAU* [laɛʁay] (34d) (cf. also 34b, f). Spelled acronyms with an initial vowel letter do not normally behave as *h aspiré* words, e.g. *l'OPA*   [lopea] (not *la OPA*) (34c).

7 Prosody

This section briefly deals with aspects of prosody, namely stress, intonation, and phrasing, which are more highly interdependent in French than in other Romance languages (cf. Delais-Roussarie et al. 2015; Avanzi/Simon/Post 2016; Di Cristo 2016; Féry 2017 for recent reviews; ###9 Intonation).[19]

Stress in French has no contrastive function, unlike in English or Spanish, and it is determined at the post-lexical level. This leads to a high degree of syncretism between stress and intonation (Delais-Roussarie et al. 2015) and Féry's (2017) categorization of French as a *phrase language*, as opposed to lexical stress, pitch accent, and tone languages. Certain regional varieties, however, may partially deviate from this categorization (cf. Simon 2012 for a synthesis of regional prosodic variation). African varieties may display tonal features as a result of contact with local languages. For instance, the variety of French spoken in Bangui, in Central African Republic, has developed a tonal system in which most words are associated with a tonal pattern that is stable across positions in the utterance (Bordal 2012). This system has been adapted from Sango, the *lingua franca* in the country; its lexical and tonal nature contrasts with the post-lexical and stress-based system of other varieties. Conservative Southern French has also maintained lexical stress, in contact with Occitan, itself a lexical stress language like other Romance languages (Sichel-Bazin 2016).

Two broad types of stress can be distinguished: rhythmic/demarcative and emphatic. They target the edges of the stress domain, which has received a variety of labels in the literature; it is referred to here as the accentual phrase (AP). The AP contains at least one content word, and its accompanying clitics if any; additional words may also be included, depending on the number of syllables, the syntactic configuration, and speech rate.

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[19] In terms of rhythm, another aspect of prosody, French joins other major Romance languages in being considered a so-called syllable-timed language, as opposed to stress-timed languages like English (cf. ###8 Comparing and deconstructing speech rhythm across Romance languages). I follow Nespor/Shukla/Mehler (2011), who consider that this rhythmic distinction is not defined by isochrony between syllables and interstress intervals, but essentially derived from other aspects of the phonological system, particularly syllable structure. Syllable-timed languages are characterized by a higher proportion of open syllables and a (relatively) more restricted inventory of syllable types (cf. Table 8) than stress-timed languages. This results in a higher proportion of vocalic portions in the signal and a reduced variability of consonantal intervals. Additionally, French, like other Romance syllable-timed languages, is characterized by a limited amount of vowel reduction in unstressed syllables.

Main rhythmic stress regularly falls on the last syllable; in other words, stress is word-final, but its realization depends on the larger context. Two examples from Jun/Fougeron (2000, 215) are given in (36); APs are delimited with braces, content words bolded and syllables bearing main rhythmic stress underlined. (36b) illustrates that adjective+noun sequences are likely to form a single AP (*mauvais garçon*) and that monosyllabic words tend not to form an AP of their own (*ment*). On average, APs in Parisian French contain 2.3~2.6 words (1.2 content words) and 3.5–3.9 syllables (Jun/Fougeron 2000). In southern varieties, monosyllables being less frequent due to the realization of word-final schwas (cf. 4.1.2), each content word tends to project its own AP (Sichel-Bazin/Buthke/Meisenburg 2012).

(36) a. {***Européen***} {*est un **mot***} {***utilisé***} {*par les **Français***}
          'European is a word used by the French'
      b. {*Le **mauvais garçon***} {***ment** à sa **mère***}
          'The bad boy lies to his mother'

APs are grouped into larger prosodic constituents. The minimal model contains one type of higher unit, called the intonational phrase (IP), among other terms. The IP carries higher-level intonational features (sentence type, illocutionary force, modality), which are also realized at the right edge of the phrase through a tonal rise or fall.[20] Significant differences in duration are also observed between IP-final syllables, AP-final (non-IP-final) syllables, and AP-medial (unstressed) syllables, IP-final syllables being about twice as long as AP-medial ones (Jun/Fougeron 2000, 221).

IP-final syllables thus combine both AP-level information (stress) and IP-level intonation. IP-final stress may however shift to the penultimate syllable as a result of the occurrence of a prepausal schwa-like vowel (cf. 4.1.1, fn. 6. For example, *sa mère* in (36b) may be pronounced [saˈmɛʁ], with final stress, or [saˈmɛʁə], with penultimate stress. In the latter case, stress and intonation can be carried by different syllables. AP-final prominence may also be distributed over the last two syllables. Penultimate marking is particularly frequent and salient in certain regional varieties, notably in Belgium (Bardiaux/Simon/Goldman 2012) and Switzerland (Avanzi et al. 2012), where penultimate syllables are lengthened and/or associated with a tonal rise. In Laurentian French, penultimate syllables

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[20] An intermediate level may be adopted, as the intermediate phrase (ip) in Delais-Roussarie et al. (2015). The occurrence of an ip, which combines several APs, is strongly related to the syntactic complexity and length of the sentence (e.g. long branching NPs, peripheral syntactic elements such as clefts, etc.). In other models of French intonation, the absence of intermediate constituents is compensated for by restructuring mechanisms between APs and IPs (e.g. Post 2000). Intermediate levels are not considered here.

are not specifically lengthened, but those containing underlyingly long vowels (cf. 2.2) may be perceived as stressed (Paradis/Deshaies 1990).

The beginning of APs may also attract stress: either a secondary rhythmic stress or an emphatic stress. Emphatic stress itself serves different functions, notably emphasis *per se* – affective (37a) or argumentative (37b) – and listing (37c). It is particularly frequent in certain speech styles, such as public speech, and it has been argued that its increasing frequency has favored the development of the rhythmic optional initial stress. The position of initial stress is variable. It falls most often on the initial syllable of lexical words (37b, c), but possibly on the peninitial one in vowel-initial words (37a). Clitics or weak words may also be accented (Jun/Fougeron 2000, 212; Delais-Roussarie et al. 2015, 67). Initial stressed syllables are marked by higher intensity and pitch; their onset consonant can also be lengthened.

(37) a.   *extraordinaire !* [ˈɛkstʁɔʁdinɛʁ]~[ɛksˈtʁɔʁdinɛʁ] 'extraordinary'
     b.   *un droit fondamental* [ɛ̃dʁwaˈfɔ̃damɑ̃tal] 'a$_M$ right fundamental'
     c.   *une personne souriante, généreuse, travailleuse…*
           [ynpɛʁsɔnˈsuʁjɑ̃t|ˈʒeneʁøz|ˈtʁavajøz]
           'a$_F$ person smiling, generous, hardworking'

Delais-Roussarie et al. (2015) characterize the intonational structure of French in terms of tonal targets. The right edge of all prosodic constituents is associated with a rising (H) or falling (L) tonal event: a pitch accent in APs (noted with *), boundary tones in IPs (noted with %). The direction of the F0 movement depends on sentence type and interaction with neighboring constituents. The AP-final pitch accent is contrastively H* or L* in IP-final position, but it is by default H* in non-IP-final APs. The IP-final position thus displays distinctive combinations of pitch accents and boundary tones, associated with different sentence types and modalities (without any one-to-one correspondence between tonal configuration and function). For instance, statements tend to be characterized by a L*L% configuration, as opposed to H*H% or H*L% for imperatives and H*H% or L*H% for information-seeking yes/no questions (cf. Delais-Roussarie et al. 2015, 98–99 for a synthesis of tonal configurations associated with different sentence types). Only three tonal combinations are frequent – L*L%, H*H%, H*L% – and this limitation distinguishes French from other Romance languages. It appears that French appeals more often to other linguistic means (lexical markers, syntactic constructions, other prosodic features) to convey contrasts that are expressed by tonal patterns in other languages.

In addition to their final pitch accent, APs may contain an initial F0 rise, labeled Hi. Each H tone may be preceded by a L target, depending on the precise location of the H accent and the availability of segmental material. Jun/Fougeron

(2000, 216) thus established the following default tonal pattern for APs: /LHiLH*/ (cf. also Delais-Roussarie et al. 2015, 70).

8   Conclusion

This chapter has presented an overview of the sound system of French, or rather Frenches, considering the emphasis put on dialectal variation. Inevitably, all topics and all varieties could not be covered with the same level of attention. The more detailed treatment devoted to schwa, liaison and the vowel inventory may be considered proportional to their privileged status in the phonological literature and the recent debates they have generated. Likewise, the description of the standard variety remains central, but the support of recent corpus data has strengthened its empirical basis, while putting it in the wider perspective of French as spoken around the world. Dialectal variation could not be addressed for all topics, however (e.g. word-level processes in Section 6), and much work remains to be done to complete the coverage of French varieties. While the chapter mostly provides a synthesis of available studies, it also takes approaches that may be considered unconventional (e.g. concerning the (non-)phonemic status of schwa) and offers new data (e.g. on word-final cluster reduction and liaison with hesitation vowels).

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